Hybrid Seed Drill

Operator's Manual

Original Instructions

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Hybrid Drill Warranty Registration

In order to activate your Claydon Warranty this page must be completed and returned to:

Claydon Yield-O-Meter Ltd
Gaines Hall,
Wickhambrook,
Newmarket,
Suffolk,
CB8 8YA
Tel: +44 (0) 1440 820 327
Fax: +44 (0) 1440 820 642

IF THE REGISTRATION DOCUMENT IS NOT RETURNED THEN THE DRILLS WARRANTY WILL BE VOID

✂----------

Hybrid Drill Warranty Registration

NAME:	
ADDRESS:	
CONTACT NUMBER:	
DELIVERY DATE:	
HYBRID SERIAL NUMBER:	

PLEASE ENSURE:

- The Machine is washed off upon delivery to remove any road salt,
- The drills hydraulic free flow service is plugged in prior to the drill being operated.

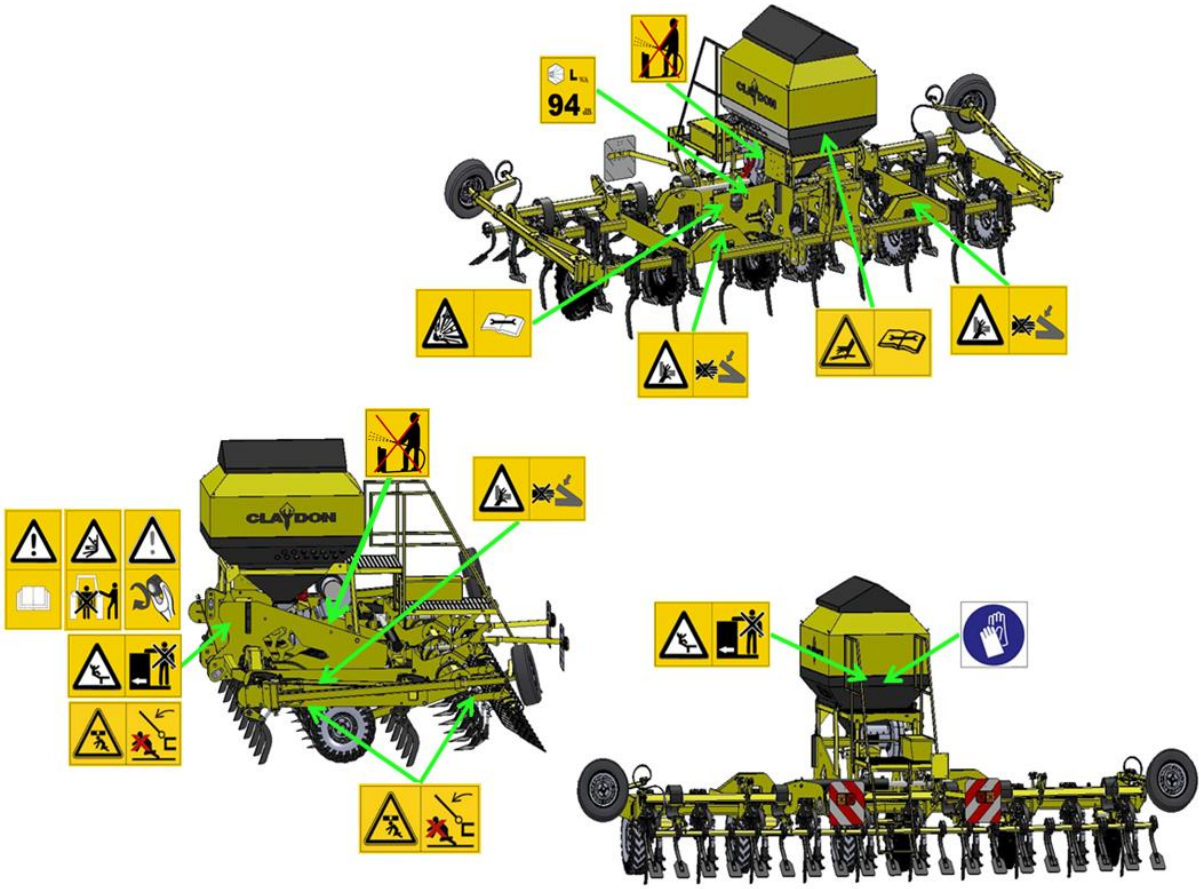
SIGNATURE:	

Safety

Safety stickers can be found located on your Claydon Hybrid drill at numerous locations, these stickers must be observed to ensure your safety and that the machine is operated in a safe manner.

Warning Symbols

If any of the stickers become illegible or peel off, new stickers can be ordered and attached in the appropriate position. The stickers must not be removed.



Meaning of warning symbols:

Read the operating manual carefully.
Prior to operating the machine the manual must be read fully and understood. Special attention should be applied to the Warnings and Cautions section.

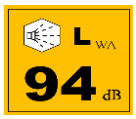
Do not stand between the tractor and the machine.
Standing between tractor and the drill is especially prohibited during coupling and uncoupling.

Riding on the machine is prohibited.
Serious or fatal injury can occur as a result of riding on the machine.

Proceed with care in the event of leaking hydraulic fluid. Defective hydraulic hoses or incorrectly seated hydraulic couplings can trigger unpredictable machine movements and cause injury.

Keep clear of slewing range.
There is an extreme risk of injury from slewing or folding machine parts.

Do not pressure wash locality.
Electronic components will be seriously damaged if event occurs.



Machine noise levels.
Noise level of fan during operation (decibels).

Wear gloves.
Gloves must be worn when handling product or preforming maintenance tasks.

Risk of crushing.
Gaps between components may become smaller or disappear completely.

Caution, danger of explosion.
Disassembly and re-pair work must be completed by a qualified person only. Accumulators contain pressurised gas and oil.

Retighten all nuts.
All nuts should be checked and retightened after a few operating hours. Nuts may come loose due to machine vibration.

Introduction

Thank you for your purchase of a new Claydon Hybrid Seed Drill. The Claydon Hybrid Seed Drill is a high performance drill designed to sow seed of a wide variety type and size. Due to its electronically controlled metering system this is achieved accurately and economically.

The purpose of this Operator's Manual is to comprehensively explain to the operator how to set up, use and maintain the machine.

It is important that the operator reads this manual carefully to correctly set up, use and maintain the machine safely. In particular, it is essential that the Warnings and Cautions section has been read carefully.

For any further assistance or explanation please contact Claydon Yield-O-Meter using the contact details given on the front cover. The serial number stamped on the left hand plate near where the top link attaches will also need to be quoted.

The Claydon Hybrid Seed Drill will give many years of excellent service with little maintenance due to its robust construction and its small number of moving parts. However, for optimum machine life some maintenance will be necessary.

We reserve the right to make future modifications to the machine that could make some diagrams and descriptions in this manual 'out of date'. While the clarity of the manual should not be affected by this, please bring any concerns to the attention of Claydon Yield-O-Meter Ltd for us to resolve the problem.

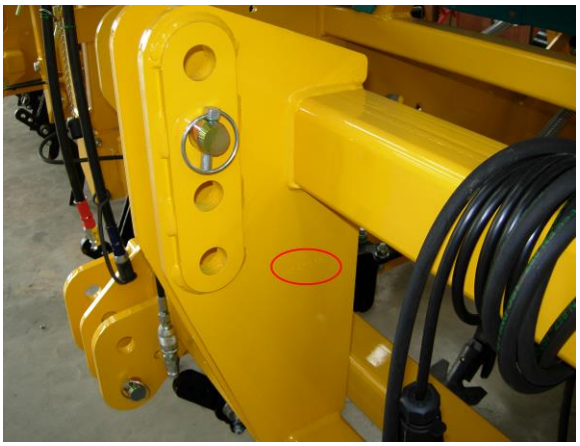
Identification of the Machine

The Claydon Range offers drills with the following specification:

Machine	Working Width	Transport Width	Weight Approx. Unladed	Max Hopper Capacity	Number of Working Rows
3m	3m	3m*	1.5 Tons	1700L	9
4m	4m	2.85m	2.2 Tons	1700L	13
4.8m	4.8m	2.85m	2.5 Tons	1700L	15
6m	6m	3m	3.2 Tons	1700L	19

* With level boards removed

In addition to the machine identification plate, the serial number of the machine is stamped into the left hand main mounting beam.



Location of serial number

Detail of serial number (enhanced)

Record your serial number here: .....

You may need to quote the serial number of your machine when you order spare parts in the future.

Directive Provisions

The Claydon Hybrid Seed Drill conforms to Machinery Directive 2006/42/EC (see Appendix B – Declaration of Conformity at the rear of the manual).

Airborne Noise Emissions

The A-weighted emission sound pressure level of measurements taken directly at the fan is 94dBA.

Warnings and Cautions

These warnings and cautions must be observed when operating the Hybrid Seed Drill.

- Ensure total weight of tractor/drill combination does not exceed permitted limits and weight of tractor is sufficient for safe field and road use.
- Do not allow anyone to stand between tractor and drill during coupling/uncoupling procedures.
- For maintenance/adjustment of the drill ensure that it is lowered to the ground on the 3 point linkage.
- Seed dressing is highly poisonous so protective measures-gloves, goggles, facemask must be used while loading the hopper and cleaning the machine after use with compressed air.
- The hydraulic system on the machine operates under high pressure and pressurised hydraulic oil is dangerous. Connecting/disconnecting the drill must only be undertaken with the tractor engine turned off and the pressure in the hoses released.
- Before operating the machine ensure no-one is standing within range of its turning circle-including the marker arms.

IMPORTANT INFORMATION for Drills with Hydraulic Stone Protection System:

- BEFORE pressurising the stone protection circuit, ensure that the drills hydraulic free flow service is plugged in as the overflow pressure is directed into this circuit and dissipated back into the tractor through the free flow return, this will avoid damage to the stone protection circuit or fan motor **(which are not covered by warranty)**.
- Always release the pressure from the stone protection system before working on the hydraulic system.
- Release the pressure from the stone protection system for over winter storage and allow the rams to go to closed centres, therefore allowing the rods some protection against corrosion.
- The Tungsten points on the leading tines should be protected by parking the drill on wooden boards.

Equipment Overview

The terms 'front' 'rear' 'left' and 'right' in this manual refer to the machine as follows:

1. 'Front' indicated the three point linkage end of the machine
2. 'Rear' indicates the machine end on which the steps are mounted
3. 'Left' indicated the left of the machine as you look at the machine from the rear
4. 'Right' indicates the right of the machine as you look at the machine from the rear.

Figure 1 – Overall view

Preparation

General

On taking delivery check for any possible damage that could have occurred during transit. Remove all loose parts (harrow tines, level boards etc.) that may have been stored in the seed hopper for transit and fit to the machine.

A tool box is supplied and contains the following items:

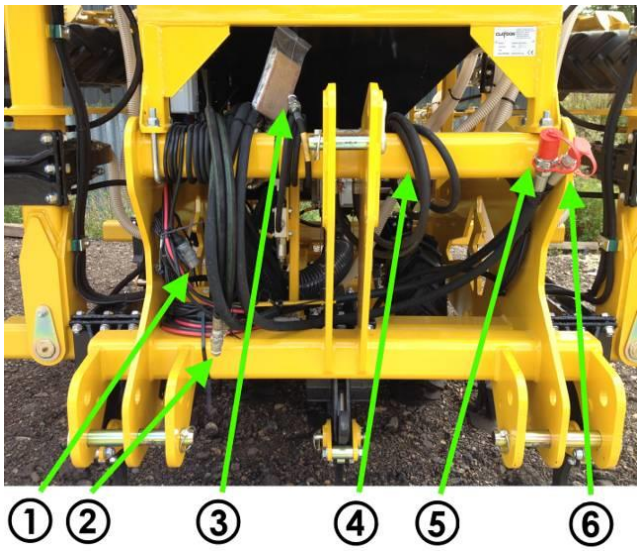
1 x Quick Release Tool
1 x Spare Front Tine (Part No SBA152)
1 x Pack of Shear Bolts (Shear Bolt version machines only)
2 x M16 U-Bolts for Tine
1x Control Unit and Cable
1 x Control Unit Mounting Bracket and Bolts
1 x Tractor Power Cable
1 x Claydon Instruction Manual
1 x Claydon Instruction DVD
1 x Parts Catalogue
1 x Calibration Scales
1 x RDS Operation manual
1 x Fan 1" ISO with 18L male thread

Please contact Claydon if any are missing.

Connecting the Drill to the Tractor

The Claydon Drill can be mounted onto any CATIIIN or CATIVN compatible three point linkage with the linkage pins supplied and CATIII balls (not supplied).

Connect the main power cable supplied with the RDS Artemis Control Unit directly to the battery terminals. Run the cable to the tractor cab by a safe route so that it can't be caught or snagged. All of the hydraulic hoses on your Hybrid Seed Drill have been colour coded and are displayed in Figure 2. THE HYDRAULIC FREE FLOW SERVICE **MUST** BE PLUGGED IN PRIOR TO THE DRILL BEING OPERATED.



	Connections	Color
1.	Light cable	-
2.	Folding wings*	Yellow
3.	Stone Protection**	White
4.	Marker Arms	Green
5.	Hydraulic Fan (Free flow service 18L connector)	Red
6.	Hydraulic fan (Pressure)	2x Red markers

*Only present on 4m, 4.8m and 6m
**Optional extra.

Figure 2 – Tractor connections (model shown 4m/4.8m)

The following labels (Figure 3) can be found located on the front of the drills seed hopper, these labels specify the corresponding hydraulic connections and there color coded indicators. The amount of hydraulic services on your Hybrid drill will alter depending on the specifications and the drills width.

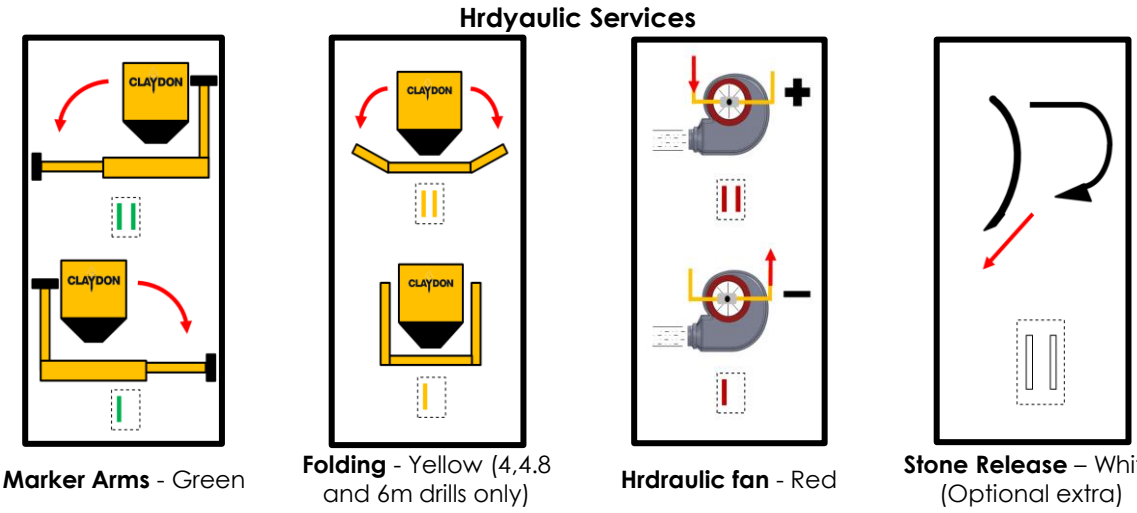
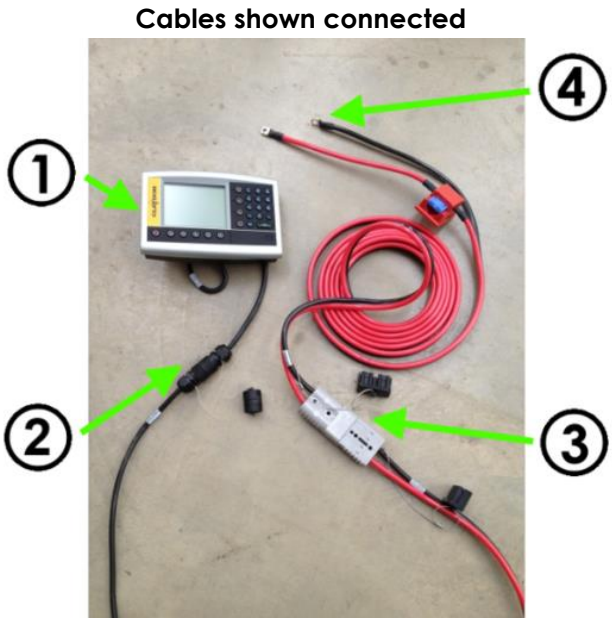


Figure 3 – Labels for hydraulic services

Mount the RDS Artemis Control Unit in a position in the cab easily visible and reachable from the driving position.

Mount the drill onto the three point linkage. Run the electric cables into the tractor cab and connect them to the relevant sockets within the cab (they will only fit their correct partners – see Figure 44). To avoid exposure to moisture, keep the connections inside the cab wherever possible.



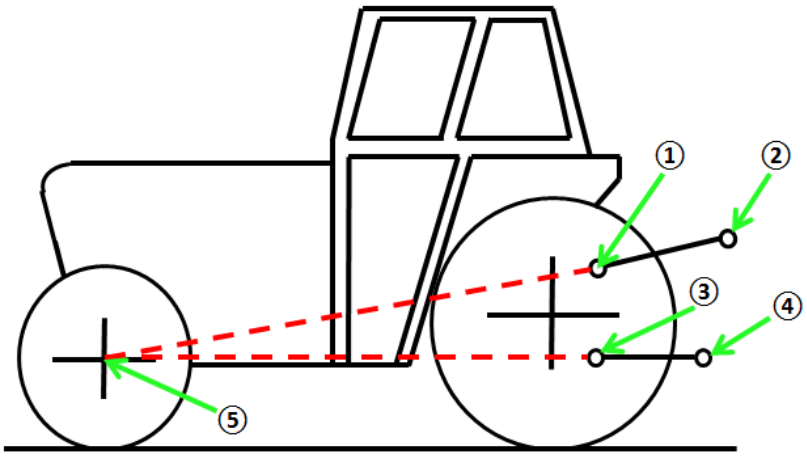
1. Artemis control unit
2. Data cable from RDS box
3. Electric power cable to RDS box
4. Electrical power cables to battery terminals

Figure 4 – Electric cable connections

CAUTION: MAKE SURE THE FAN RETURN IS PLUGGED INTO A 'FREE FLOW RETURN' ON THE TRACTOR.

Connect the hydraulic hoses to the tractor spools in their relevant pairs. The 1" ISO female coupling with 18L male thread supplied with your drill will have to be connected to the tractor rear axle. If necessary, your tractor dealer will advise. The return pipe cannot just be inserted into the filler cap as the oil cannot return to the pump sufficiently quickly in many tractors. DO NOT CHANGE THE 1" ISO TO A DIFFERENT SIZE AS THIS COULD CAUSE DAMAGE TO THE MOTOR, WHICH ARE NOT COVERED BY WARRANTY. The fan return cannot be connected to the tractor ISO.

Once the drill is attached and at the correct working depth, the top link should be set at an angle in which the convergence point between the upper and lower link arms should fall at the front axle (Figure 5). This can be achieved by altering the top link pin attachment points on the tractor and drill. This ensures stability and the mass of the implement is used correctly.



1. Upper link point
2. Upper hitch point
3. Lower link point
4. Lower hitch point
5. Vertical virtual hitch point

Figure 5 – Top link convergence position

Transportation

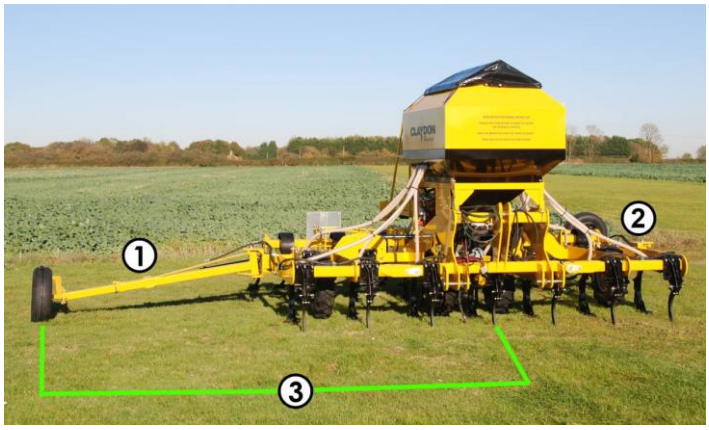
Raise the machine off the ground and fold the wings fully upright (applies to 4m, 4.6m and 6m machines). Once folded, turn the hydraulic tap parallel to the cylinder to lock the wings in the upright position (Figure 6). To unfold the wings turn the hydraulic tap in the opposite direction and operate the spool valve. **Never** transport along public highways without isolating the folding wings.

Figure 6 – Location of wing isolation hydraulic tap

Marker Arms

On delivery of the drill the marker arms may be in their shortest position for transport. Both marker arms will have to be set up for the working width of the machine. Additionally, should the driving position not be central (either through driver's choice or position of the seat) it may be necessary to adjust the two markers to avoid gaps or overdrilling.

Figure 7 shows where to measure from in order to set the marker arm distance followed by a brief explanation on how to achieve this. It is advised to carry out this process when the drill is in the ground and at the correct working depth.

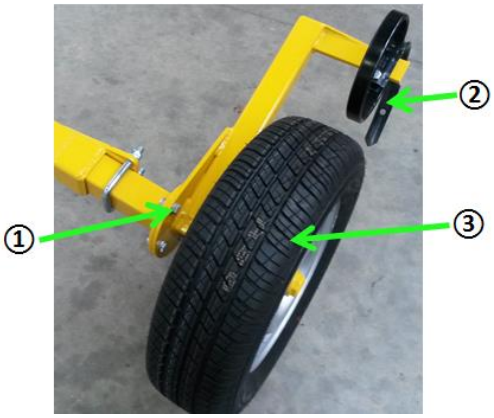


1. Marker arm extended
2. Marker arm folded in
3. Working width of the machine, from the centre of the middle tine to the centre of the marker point

Figure 7 – Marker arms

Measure horizontally from the centre of the middle (leading) tine on the machine to the centre of the marker point (the spring tine at the marker arm, that runs behind the wheel), with the marker arm swung out completely. This measurement needs to be equal to the width of the machine, e.g. for a 4.8m wide machine the measurement between the two points must be 4.8m. To lengthen the marker arm, slacken the U-Bolt, slide the arm out to the correct length and retighten.

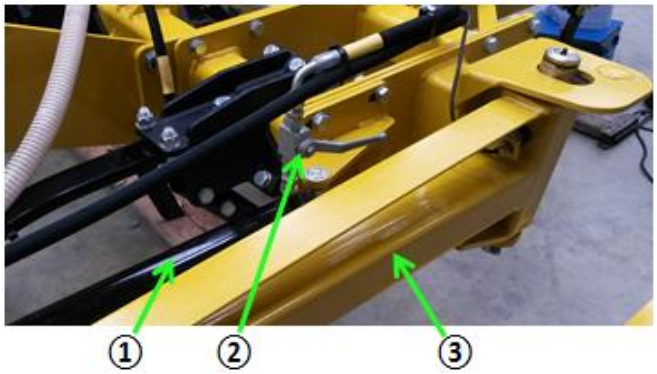
If the marker arm tine is not aggressive enough during operation, then a more prominent mark can be made by adjusting the tine angle. This is achieved by slackening the bolts at the stub axle shaft and allowing the whole unit to pivot round on the slotted holes (Figure 8).



1. Stub axel bolts (x3)
2. Marker arm tine
3. Marker arm wheel

Figure 8 – Stub axel marker arm arrangement

When the drill is in transport, the Hydraulic valve taps (located on the hydraulic cylinders, Figure 9) should be locked off to prevent the marker arms being unfolded.



1. Marker arm cylinder
2. Hydraulic valve tap (currently in the closed position
3. Marker arm

Figure 9 – Location of marker arm isolation valve taps

Radar Recalibration Process

Once your Hybrid Seed Drill is fully connected to the tractor it is recommended that the drills radar should be recalibrated. Firstly a 100m stretch should be measured out and marked using two indicators. The drill should be in the ground and the tractor should be stationary at the beginning of the 100m run. It is recommended that the marker arm should be extended out so it can be used as a guide when crossing the second indicator.

Figure 10 displays how to navigate the Artemis control box in order to select the radar recalibration process once the tractor and drill are in position.

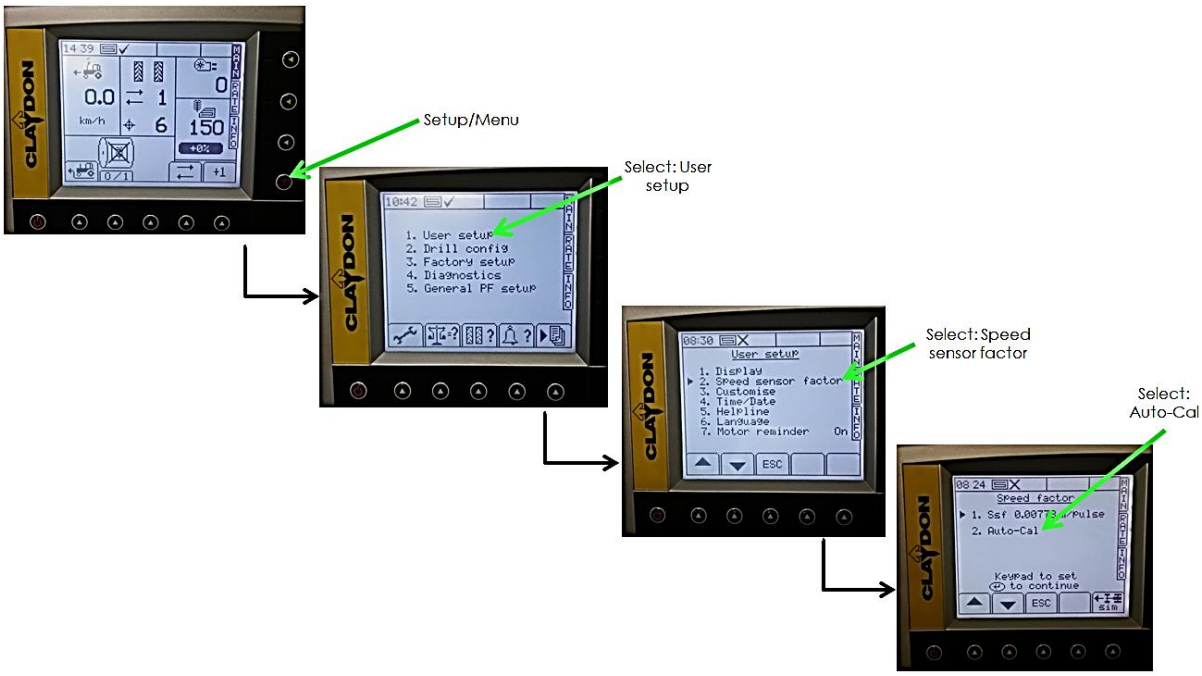


Figure 10 – Navigation process to radar recalibration

By selecting the "Auto-Cal" option the radar calibration procedure can now begin, this procedure should start from a standstill and come to a stop at the 100m indicator. The screens displayed on the Artemis box during this procedure can be seen in Figure 11.

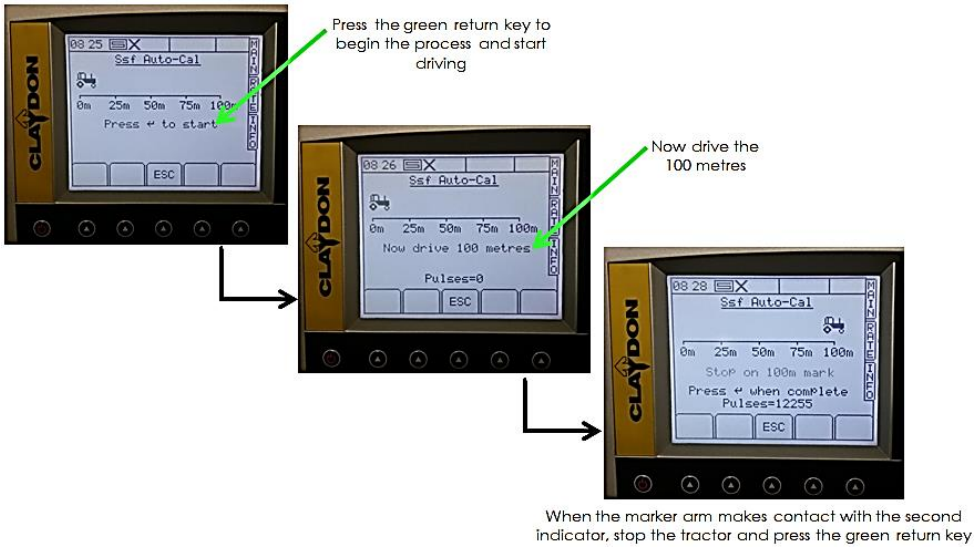

Press the green return key to begin the process and start driving
Now drive the 100 metres
Ssf Auto-Cal
0m 25m 50m 75m 100m
Press ↵ to start
Now drive 100 metres
Pulses=0
Stop on 100m mark
Press ↵ when complete
Pulses=12255
ESC
When the marker arm makes contact with the second indicator, stop the tractor and press the green return key

Figure 11 – Radar recalibration sub menu

On completion of the 100m run a new factor will be displayed, the green return key must be pressed once more to accept and store the new factor. Once the new factor has been stored the control box will return to the Setup menu.

Changing/releasing the Stone Release Pressure

(Hydraulic Stone Protection Machines only)

The optional Stone Protection System is designed to safeguard the drill from damage when operating in stony conditions.

The free flow return on the drill MUST be plugged into the tractor otherwise the pressure released from the stone protection circuit can damage the hydraulic motor. The hydraulic fan motors are not covered by warranty.

Plug the hydraulic pipe running from the valve assembly (mounted under the seed hopper) into the tractor. Turn the tap to the 'open' position (parallel to the direction of the pipe Figure 12; this may release the pressure from the circuit back into the tractor depending on the spool valve position.

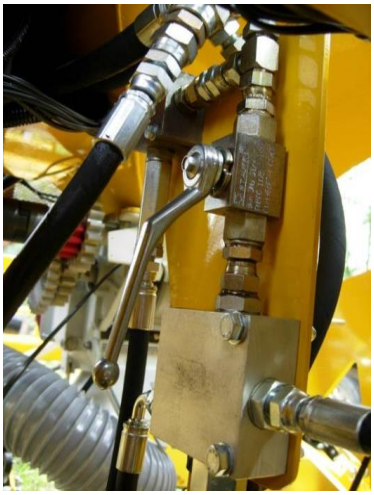


Figure 12 – Tap in open position

Before carrying out work on the hydraulic stone protection system, the pressure gauge (highlighted in Figure 13) MUST read 0 with the spool valve in float or open position. It is dangerous to work on the hydraulic circuit while it is under pressure.

Figure 13 – Stone Protection pressure gauge

Using the tractor's hydraulics, the circuit needs to be pressurised to the required pressure (maximum pressure is set to 110 bar {1600 psi} from the factory). In the event that it is higher or lower, please call Claydon for guidance on how to adjust it (see Contact Details on front cover).

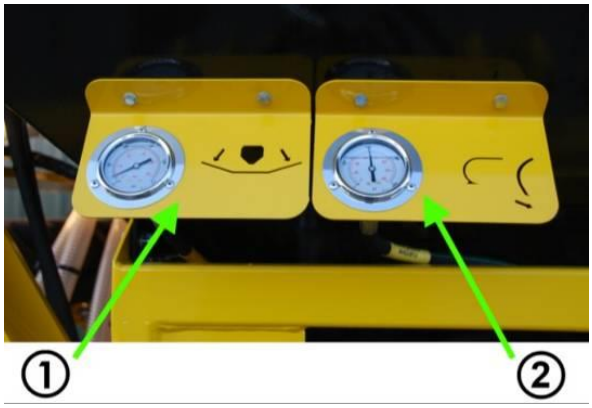
When the required pressure is met, turn the tap to the 'off' position (at a right angle to the direction of the hose Figure 14).

Figure 14 – Tap in closed position

Wing Balancing Kit – 6m Machines Only

The Wing Balancing Kit spreads the weight of the chassis and the full hopper over the whole width of the drill and not just in the centre section. In this way, it allows the wings to float and follow the contours of the ground.

To ensure the kit is working correctly the operator should operate the tractor spool valve to lower the wings, (spool needs to be set up so pushing the controller forward lowers the wings, the spool must also have a float position.) once the pressure has reached 10 bar (145 psi) the operator needs to push the controller fully forward into float to allow excess pressure to return to the tractor in the event of the drill hitting a large obstacle and the wings raising beyond their pre-set limit. The location of the pressure gauge can be seen in Figure 15.



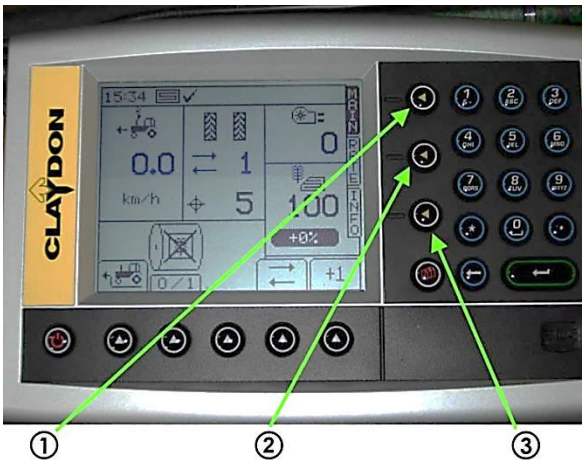
1. Wing balancing pressure gauge
2. Stone protection pressure gauge

Figure 15 – Pressure gauges for Wing Balancing Kit and Stone Protection Unit

Setting Up and Calibrating the Seed System

Navigating the Control Unit (brief guide)

This is a brief guide to using the RDS Artemis Control Unit while in work. The RDS manual supplied with the machine should be read for full instructions. The Artemis display has 3 main screens which can be selected using the arrow buttons on the right hand side of the display. The screens are 'Main', 'Rate' and Info.



1. Press to select Main screen
2. Press to select Rate setting screen
3. Press to select Info page

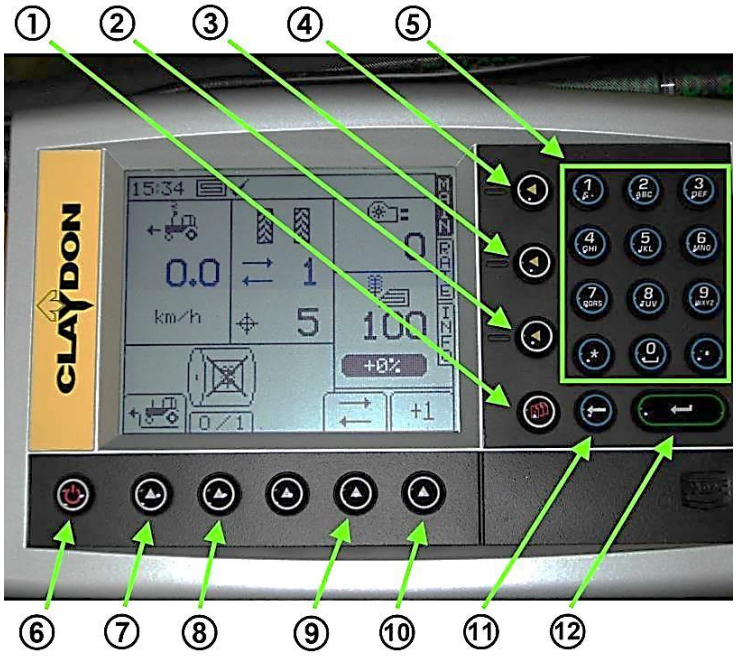
Figure 16 – Screen selection

Main Screen

An overview of the Artemis Main screen can be seen in Figure 17; this screen will be displayed when the control box is first turned on and whilst in work. Figure 18 displays the navigation buttons located on the Artemis box.

1. Time
2. Area cut out status
   (√ = In work, X = Out of work)
3. Tramline number
4. Fan speed (rpm)
5. Manual Override Seed Metering
   (On/Off)
6. Forward speed
7. Seed rate

Figure 17 – Main screen indications



1. Setup Menu
2. Go to INFO Screen
3. Go to RATE Screen
4. Go to MAIN Screen (currently displayed)
5. Number Key Pad
6. Power On/Off Button
7. Pre-Start, starts metering unit prior to moving forward
8. Manual Override Seed Metering (On/Off)
9. Auto Tramline advance (On/Off)
10. Tramline number nudge (tramlines come on when on highest number, 5 of 5 in this case)
11. Backspace key
12. Enter Key

Figure 18 – Main screen controls

Rate Screen

Figure 19 displayed the Rate screen sub menu, the corresponding buttons and their functions can be seen in Figure 20.

1. Time
2. Area cut out status (√ = In work, X = Out of work)
3. Seed rate set (Target)
4. Seed rate applied(current)
5. Maximum drilling speed

Figure 19 – Rate screen Indications

1. Navigate to INFO Screen
2. Navigate to RATE Screen (currently displayed)
3. Navigate to MAIN Screen
4. Number Key Pad
5. Power On/Off
6. Decrease Seed Rate by 5%
7. Increase Seed Rate by 5%
8. Return Seed Rate to target (target Seed Rate 100Kg/Ha displayed)
9. Setup Menu
10. Backspace Key
11. Enter Key

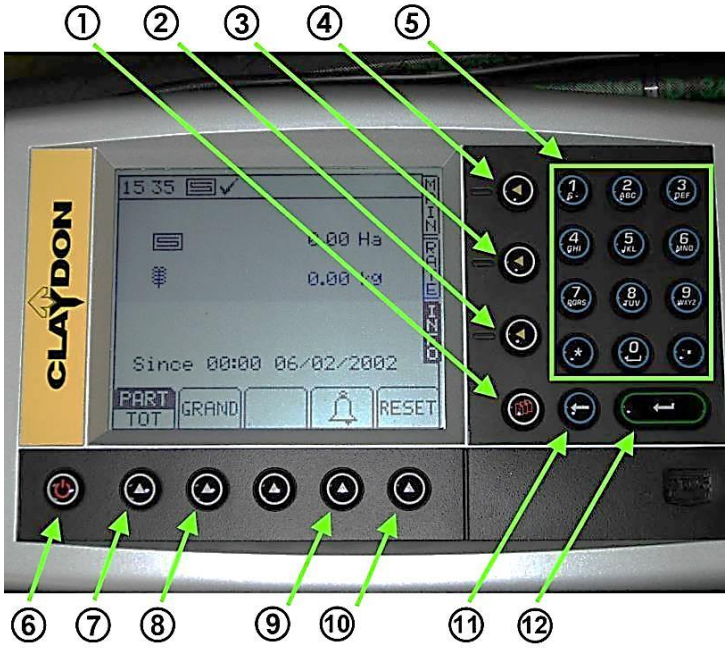
Figure 20 – Rate screen controls

Info Screen

Figure 21 displayed the Info screen sub menu where the amount of hectares (Ha) and quantity of seed (Kg) can be viewed. The corresponding buttons and their functions can also be seen in Figure 22.

1. Time
2. Area cut out status (√ = In work, X = Out of work)
3. Area covered (Ha)
4. Quantity dispensed (Kg)
5. Time in operation since date

Figure 21 - Info screen Indications

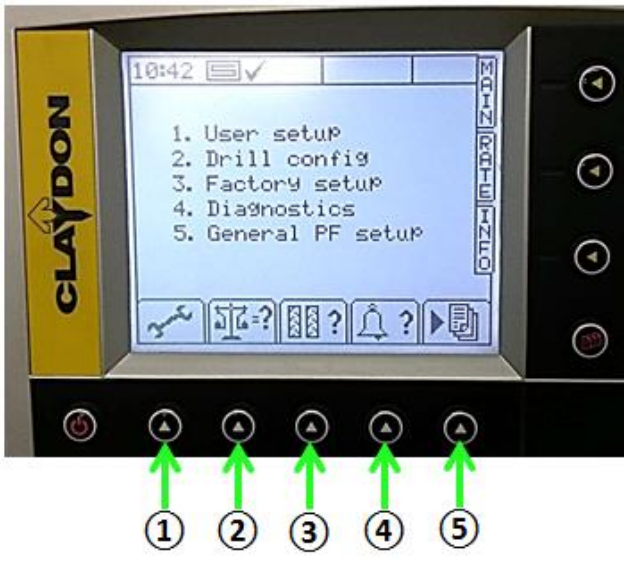


1. Setup Menu
2. Navigate to INFO Screen (currently displayed)
3. Navigate to RATE Screen
4. Navigate to MAIN Screen
5. Number Key Pad
6. Power On/Off
7. Select Part Total/ Normal Total (Part Total currently in view)
8. Select Grand Total Screen
9. Not in use in this function
10. Reset Total (only applicable to part total and Normal Total)
11. Back Space Key
12. Enter Key

Figure 22 – Info screen controls

Setup Menu

On pressing the Setup Menu key the screen displayed in Figure 23 will be shown, shortcut keys are now present along the bottom of the screen; the corresponding buttons are positioned directly under each option.



1. Calibration check button
2. Shortcut to manual calibration screen
3. Tramline Setup
4. Alarms Setup
5. Data Logging and Variable Rate functions

Figure 23 – Shortcut keys within setup menu

The Calibration check option will be discussed in greater detail after the calibration procedure has been described. The Tramline and Alarms Setup menus will be explained in the following sections, for further information on the remaining Setup screens please consult the RDS manual.

Tramlining

In order to adjust the required tramline width or to turn the system off completely access the tramline Submenu by pressing the tramline shortcut key (Figure 24).

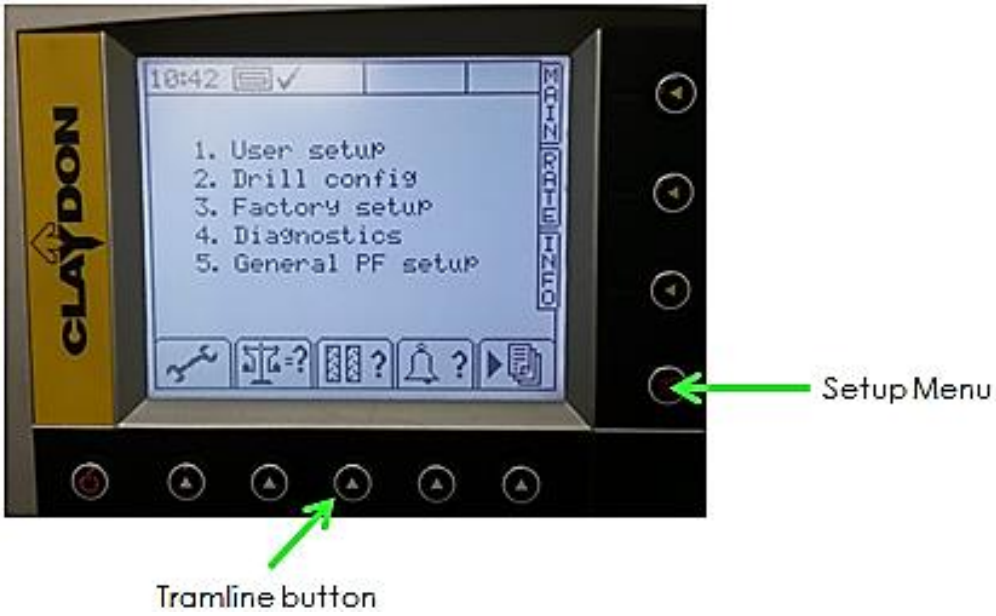


Figure 24 – Tramline shortcut key

Once the tramline option key has been selected, the tramline setup menu displayed in Figure 25 will be displayed. Within this sub menu the spray width can be adjusted or tuned off by altering the target number of bouts. Furthermore the tramline rhythm can also be altered between Symmetrical, Asymmetrical left and Asymmetrical right using the navigation keys (Figure 25).

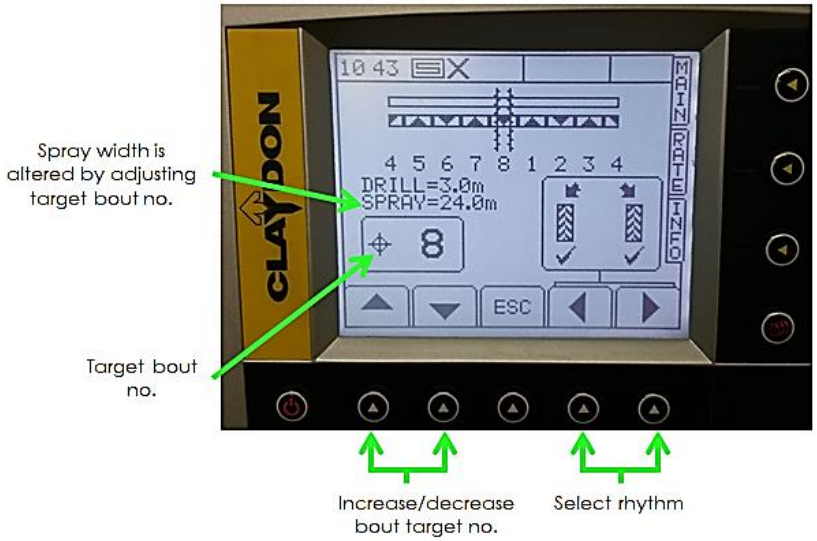


Figure 25 – Tramline sub menu screen

Alarms Setup

In order to view the fan speed alarm limits and the status of the hopper level sensors, the alarms setup menu can be accessed by pressing the alarms shortcut key (Figure 26).

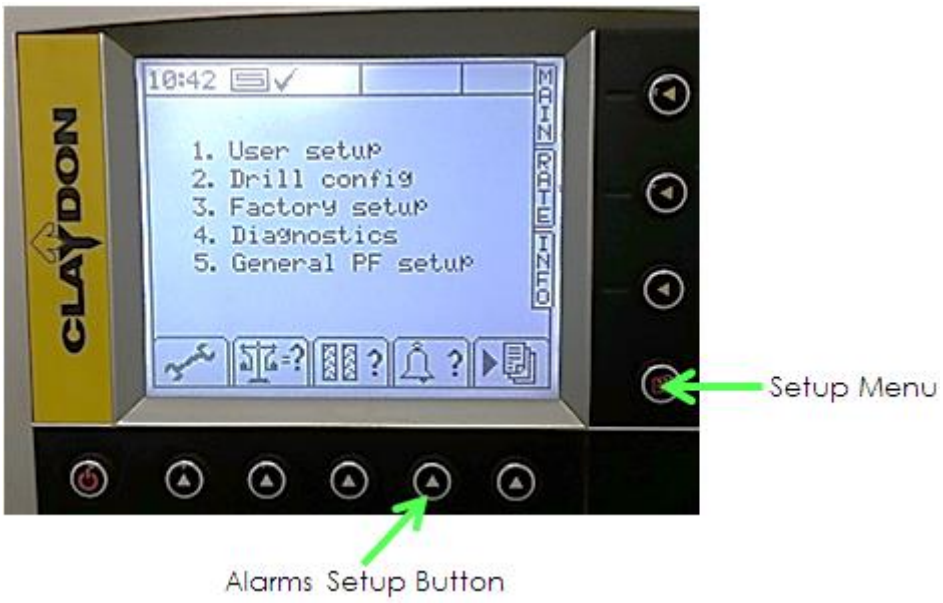
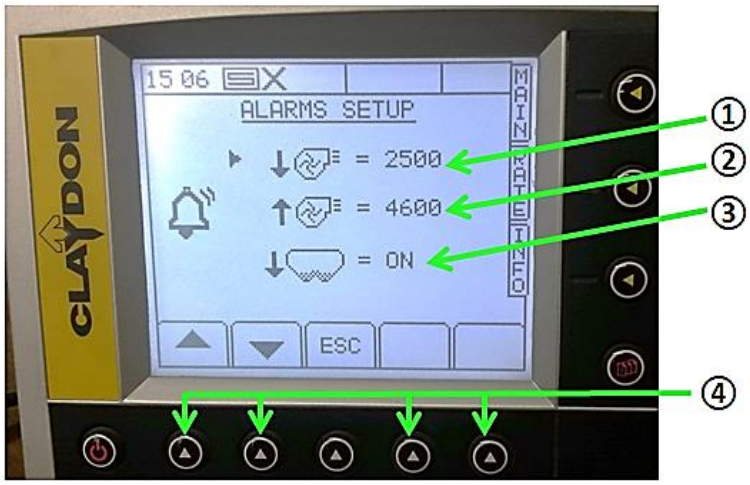


Figure 26 – Alarms shortcut key

Figure 27 displays the recommended fan speed threshold settings and whether the seed low level sensor is activated. If the fan speed drops or exceeds the pre-set alarm thresholds then the system will alarm and the metering units will not run.



1. Lower level fan speed setting
2. Upper level fan speed setting
3. Seed low level sensor (Currently On)
4. Navigation buttons

Figure 27 – Alarms sub menu screen

The seed low level alarm can be turned off by firstly using the navigation buttons located on the left of the Artemis unit to select the level sensor option. Once selected, use the navigation buttons on the right of the Artemis unit to turn the level sensor either on or off.

Setting Up the Seeding System

As previously described, make sure the Artemis Control Unit and all electrical connections are correctly installed. Connect the two black round connectors to power up the Control Unit.

If the Control Unit is beeping with a forward speed alarm this can be turned off by pressing the Metering On/Off button. To enable seeding, press the Metering On/Off button again.

The toggle switch comes attached to its mounting plate. Position the mounting plate to straddle the upright plate of the headstock. The drill should be placed on a solid surface while attached to the tractor. The toggle switch bracket should now be slid up or down the headstock plate until the switch is in the neutral position (in the middle) and just touching the bottom of the top link. Now tighten the pinch bolts up to lock the bracket into place. The purpose of the switch is to turn the seeding system on and off. With the drill in the working position and at drilling depth there should be approximately 5mm clearance between the switch and the underside of the top link.

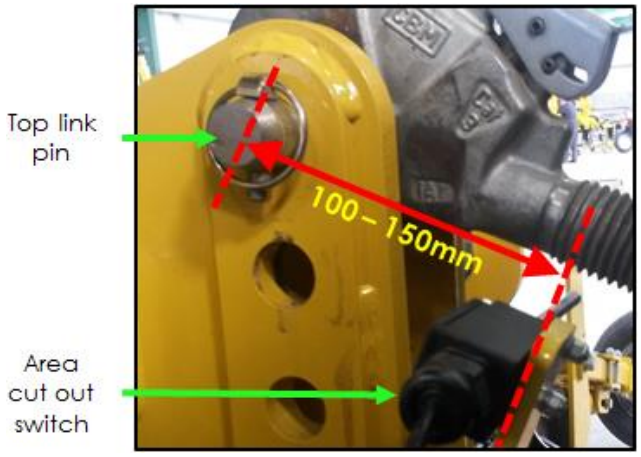
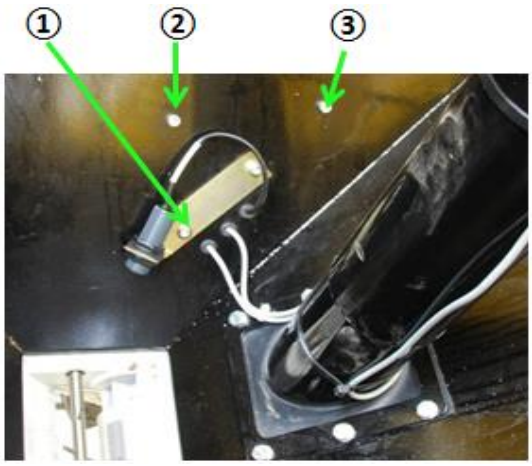


Figure 28 – Spring toggle switch shown in work position

The seed level sensor can be set in three positions for different seed rates: the upper for high seed rates, the middle setting for medium seed rates and the lower position is ideal for low seed rates i.e. Oilseed rape.



1. Setting for low seed rates (Current position)
2. Setting for medium seed rates
3. Setting for high seed rates

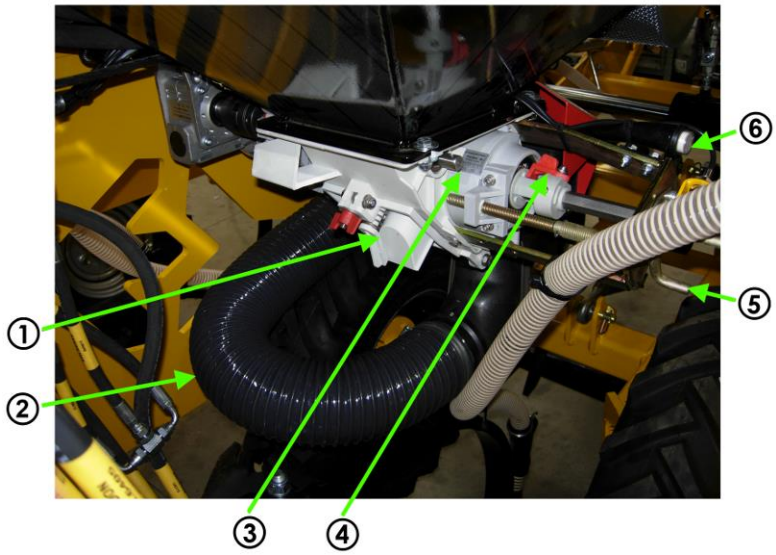
To adjust the hopper level sensor setting: From inside the hopper pull the end of the bracket nearest the sensor away from the hopper and over the locating bolt head. Move the sensor to the required position and locate on the appropriate bolt head.

Figure 29 – Level sensor in lower position

Calibrating the Seed Rate

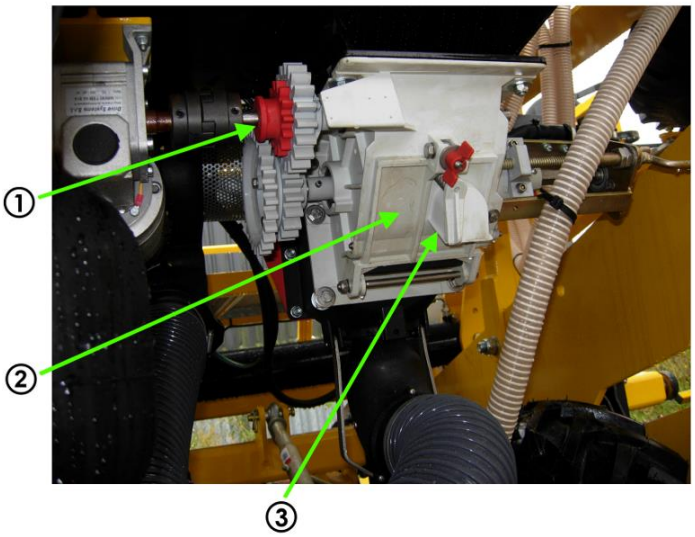
Prior to explaining the calibration process an overview of the metering units highlighting the various components can be seen in Figures 30 – 34.

Overview of the Metering Unit



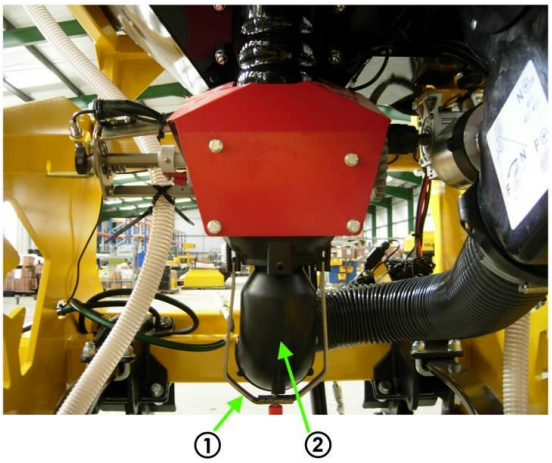
1. Lid to empty hopper
2. Air pipe
3. Slider position scale
4. Red lever
5. Handle
6. Calibration button

Figure 30 – Metering unit



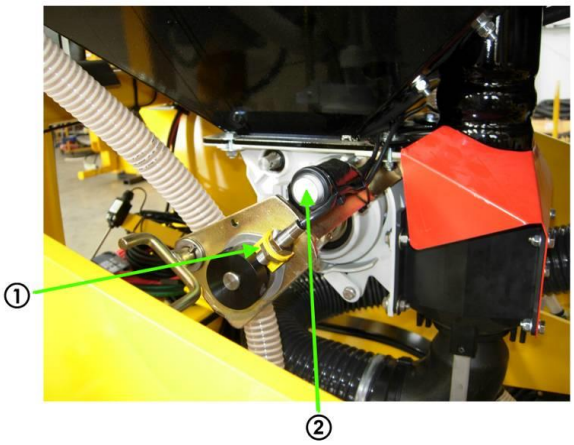
1. Red cog should always remain in the closed position (high gear)
2. Lid for emptying large seed amounts and cleaning seed wheel
3. Outlet for emptying smaller seed amounts (e.g. OSR)

Figure 31 – Gearing



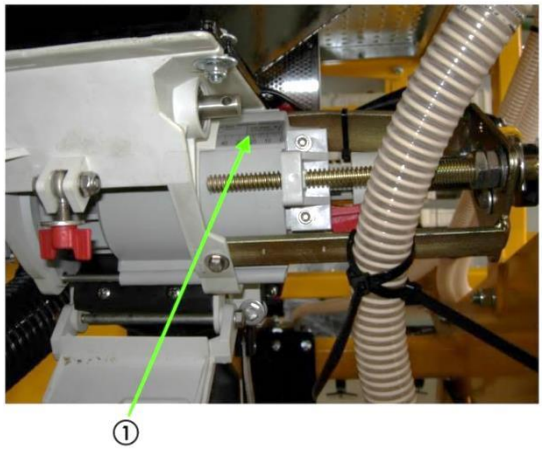
1. U Bracket
2. 90 degree Bend

Figure 32 – Rear view



1. Speed sensor for metering system
2. Calibration button

Figure 33 – Speed sensor and calibration button



1. Slider position

Figure 34 – Slider position Method

To make sure seed is being metered and sown at the required rate it is necessary to take and weigh a sample from the metering unit. This weight is then entered at the Artemis Control Unit which will calculate and adjust for any error-i.e. the error being the difference in seed weight between what the control unit calculated would pass through the metering system per revolution and what was actually weighed. With the seed hopper empty follow the method below to calibrate your drill:

Small Seeds (OSR etc.)	Larger Seeds (Cereals etc.)
1) At the metering unit wind in the handle until it is fully closed (the O position).	
2) Turn red lever to intersect drive shaft key way (see Figure 35.1).	Turn red lever so that it is not in the drive shaft key way (see Figure 35.2).
3) Fan deflector lever needs to be set perpendicular to pipe direction (Figure 36.1).	Fan deflector lever needs to be set parallel to pipe direction (Figure 36.2).
4) If necessary, ensure that the white and red gears are aligned by pushing the white button so that the red gear will insert into the grey/white gear and push into place. This setting should always be used and gives high speed gearing at all times.	
5) Wind out handle to about 15 on slider (20 max), see Figure 34. For more comprehensive details on slider positions consult Appendix C (at the rear of the manual).	Wind out handle to about 80 on slider. The handle may be wound out further to achieve higher speeds (Figure 34). For comprehensive details on slider positions consult Appendix C.
6) Undo the U bracket and release the 90° bend. Place a bucket under the metering unit, prime the metering unit by pressing the white button and hold for three seconds to start the metering motor, this ensures the unit is full of seed prior to an automatic calibration. Press the white button again and hold for another three seconds to stop seed flow. Empty the bucket.	
7) To commence the automatic calibration procedure, position a bucket which you have accurately weighed in its place under the metering unit. Press the white button and hold for three seconds, to start the metering motor. When you have obtained a good sized sample, press the white button again and hold for another three seconds to stop seed flow, (the motor may not stop immediately).	
8) Weigh the bucket with the sample in accurately (grams for small seeds kg for large seeds).	
9) Subtract bucket weight.	
10) At the Artemis control unit select grams for small seeds or kg for large seeds (Figure 37).	
11) Enter the weight measured (Figure 37).	
12) Press the Enter key three times to correct the error (Figure 37).	
13) Select the rate screen (middle arrow button to the right of the screen).	
14) Type in the seeding rate you require on the number pad.	
15) The Control Unit will automatically set the seeding rate and display the maximum drilling speed. If you consider this speed too slow you can wind the handle on the metering unit out further to allow more seed through and repeat the calibration process.	
16) To check that the calibration is now correct, repeat the process. The error displayed should now be between 0 and 4%.	
17) MAKE SURE you replace the 90° bend on the bottom of the metering unit.	
18) Ensure the fan speed is set between 3200 - 3500 RPM	Ensure the fan speed is set between 4300 – 4500 RPM

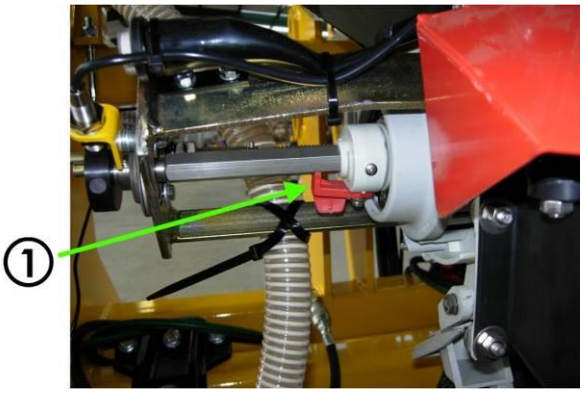


Figure 35.1 - Red lever (on shaft) out, small seed setting

Figure 35.2 - Red lever (on shaft) in, large seed setting

Figure 35 – Red lever positions

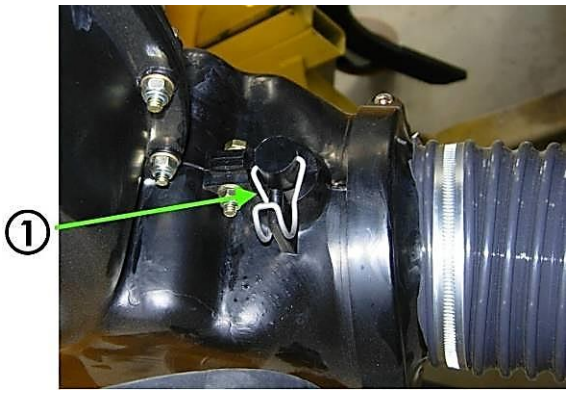


Figure 36.1 - Deflector set for small seeds (OSR)

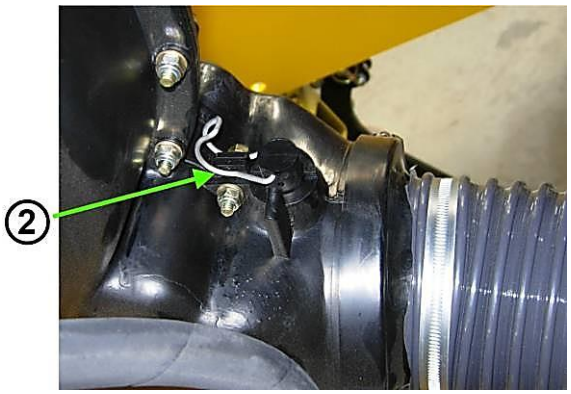


Figure 36.2 - Deflector set for large seeds (cereals)

Figure 36 – Deflector settings

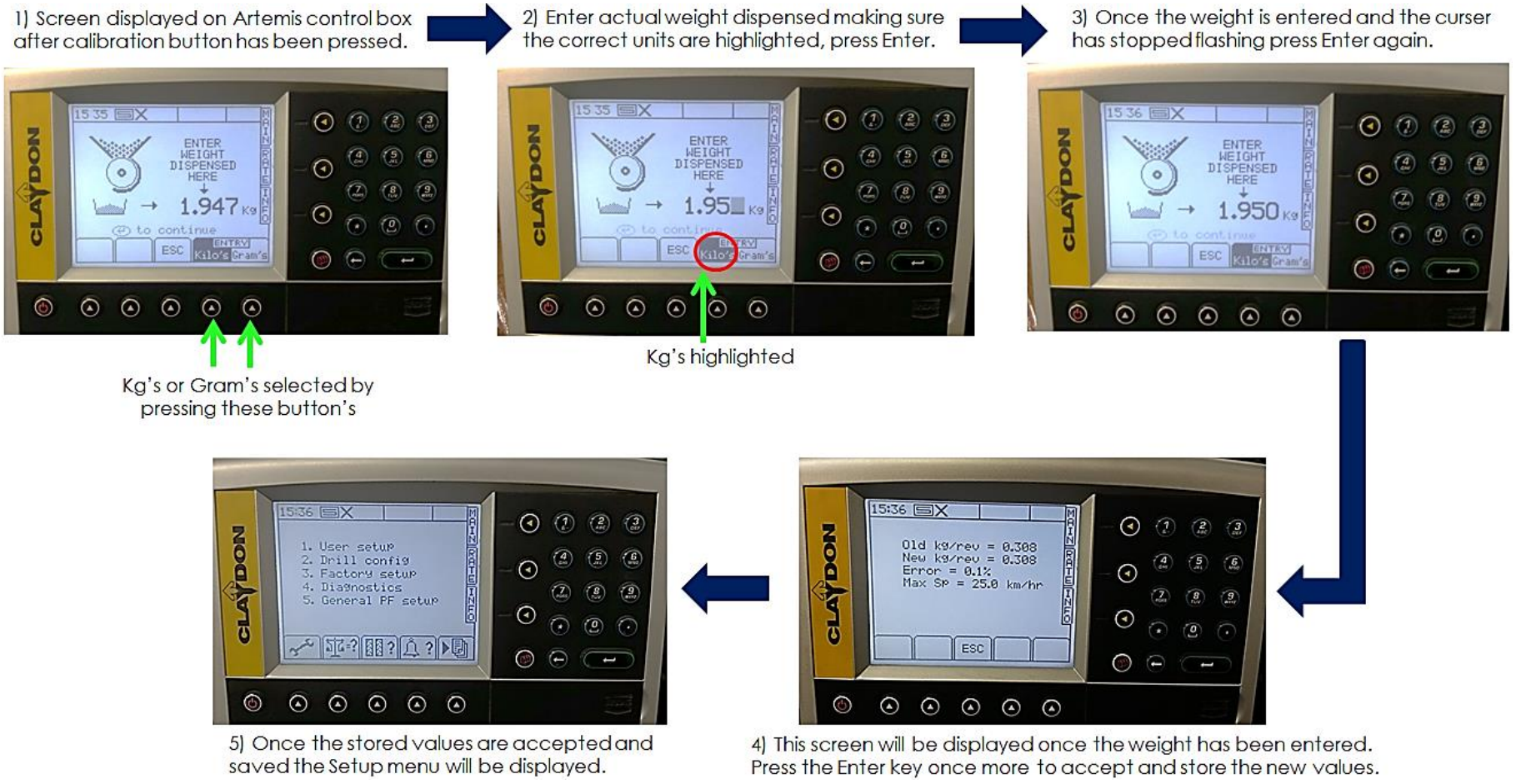

1) Screen displayed on Artemis control box after calibration button has been pressed.
2) Enter actual weight dispensed making sure the correct units are highlighted, press Enter.
3) Once the weight is entered and the curser has stopped flashing press Enter again.
ENTER WEIGHT DISPENSED HERE
1.947 Kg
1.95 Kg
1.950 Kg
to continue
ESC
Kilo's
Gram's
Kg's or Gram's selected by pressing these button's
Kg's highlighted
1. User setup
2. Drill config
3. Factory setup
4. Diagnostics
5. General PF setup
Old kg/rev = 0.308
New kg/rev = 0.308
Error = 0.1%
Max SP = 25.0 km/hr
5) Once the stored values are accepted and saved the Setup menu will be displayed.
4) This screen will be displayed once the weight has been entered. Press the Enter key once more to accept and store the new values.

Figure 37 – Calibration process on Artemis control box

Calibration Check

To ensure the metering unit has been calibrated correctly, it is possible to perform a calibration check by observing the "Cal. Factor". This is checked by firstly pressing the Setup menu button, from the Setup menu the calibration check button should then be pressed (Figure 38).

1. Calibration check button

Figure 38 – Calibration check option

Once the calibration check button has been pressed the screen in Figure 39 will be displayed and the "Cal. Fact" can now be seen. This value is the kg of seed dispensed for each revolution of the metering unit.

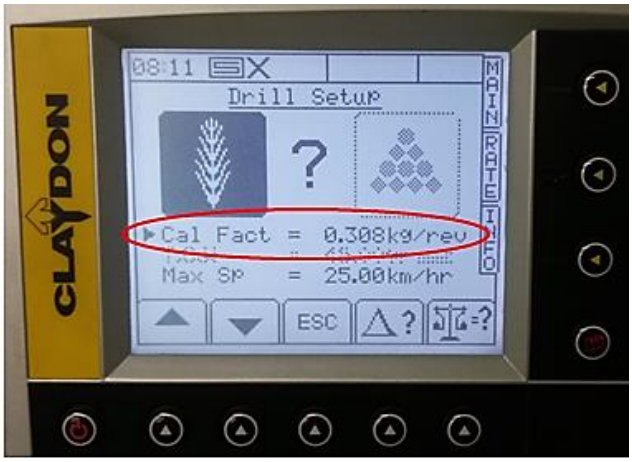


Figure 39 – Calibration Factor highlighted

This value is generated after every calibration and can now be compared against the calculated "Cal. Factors" in Appendix D (at the rear of the manual). If large discrepancies are present between the "Cal. Factors" in Appendix D and what is displayed on the control box, a recalibration may be required.

Field Use of the Drill

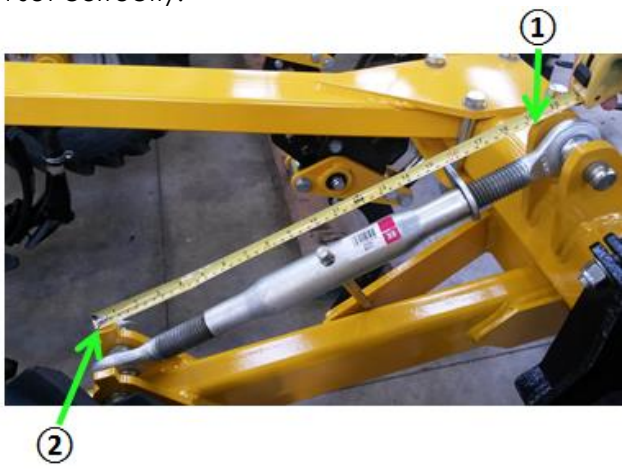
Set Machine Level

It is important that the machine is set level from front to rear to gain accurate and consistent seed depth between the front and rear seeding tines, this is achieved by adjusting the tractors top link. To confirm the seed drill is set up evenly, the depth wheels positioned across the width of the machine should be firstly set so the drills A-Shares scalp the field's surface when in work (Figure 40).

1. Front A-Shares
2. Rear A-Shares
3. Seed depth adjustment
4. Depth wheel

Figure 40 – Front and rear tines scalping field's surface

This can be achieved by setting the depth wheels to one of the measurements displayed in Figure 41. The depth can be accurately set by measuring between the lugs on the depth wheel assembly (Figure 41). By altering the depth wheels to one of these measurements the front and rear A-Shares should scalp the field's surface evenly, if the tractors top link has been set correctly.



1. Angled flat on lug on which to measure
2. Hook tape measure over square lug

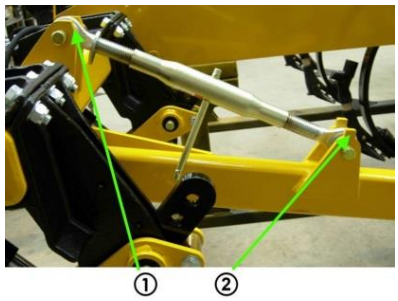
For a **4m, 4.8m and a 6m** drill measurement should be: **495mm**

For a **3m** drill measurement should be: **475mm**

Figure 41 – Measurement lugs located on depth wheels

Set the Seeding Depth

Once the machine has been set level front to rear, the seeding depth can be set by re-adjusting the top links on the depth wheels (Figure 42) positioned across the width of the machine. Check that the adjusters are all the same length with a tape measure using the position lugs as previously described (you can measure between the pins if you prefer).



1. Angled flat on lug on which to measure
2. Hook tape measure over square lug

Figure 42 – Setting the seeding depth

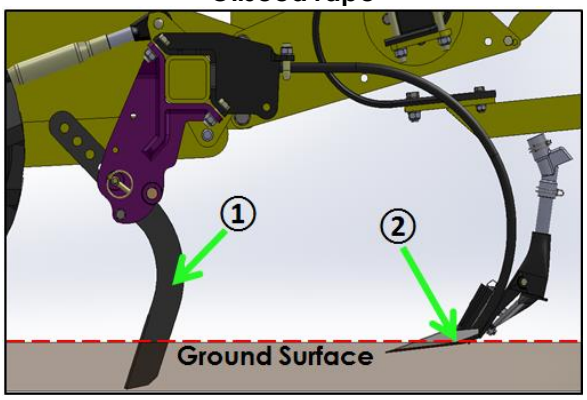
Lower the machine into the ground and drive a short distance, brush away the tilth where the straw is still attached and find the original surface level of the field. Now brush back and find the depth of the seed compared to the original level of the field. Ignore how much soil is directly on top of the seed as this will level out and settle down to the original field level.

1. Seed depth
2. Original soil level

Figure 43 – Seed depth

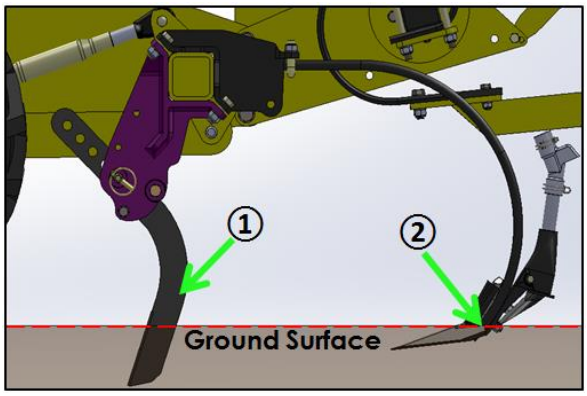
To ensure the correct drilling depth has been achieved the depth of the drills A-Shares relative to the grounds surface should be examined. Figure 44 displays the recommended A-Share depth for Oilseed rape (shoulder of A-Share should coincide with ground surface) and Wheat (top of A-Share should coincide with ground surface).

Oilseed rape



1. Leading tine
2. A-Share depth - OSR

Wheat



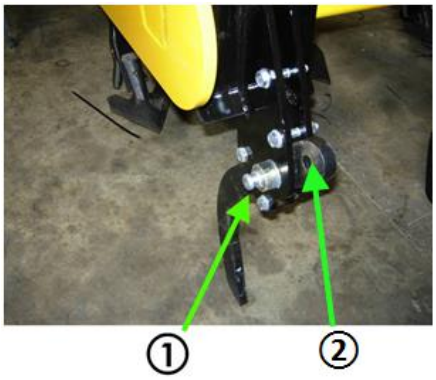
1. Leading tine
2. A-Share depth - Wheat

Figure 44 – Recommended A-Share depth for OSR and Wheat

Once the seed depth is set you can set the depth of the front tine, as a guide the front tine should be set to approximately:

- 120 - 150mm deep for Oilseed rape,
- 100mm for Cereals,
- 125mm for autumn Beans and Maize,
- 75-100mm for Spring Beans.

The front tine is adjusted by simply removing the pin, sliding the tine to the required depth position hole (Figure 45) and reinserting the pin.



1. Remove pin and slide tine up or down to required position
2. Wear hole

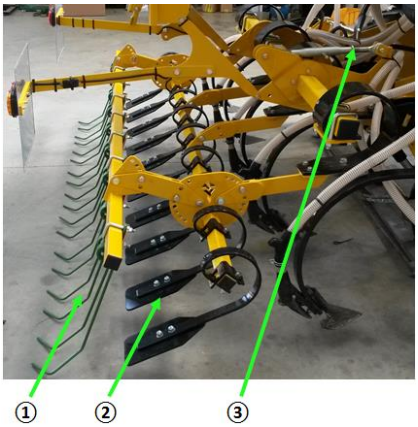
Figure 45 – Setting front tine depth

The top hole should not be used on brand new tines; it is only to be used once the tine has begun to wear. Do not operate the front tine deeper than 150mm.

Set Up the Level Board

The Level Board (also known as Batter Board or Ski Board) should be set up to drag along the top of the ridges with little down pressure. The down pressure can either be increased or decreased by altering the adjuster at the rear of the drill (Figure 46). The levelling boards are designed to level the ridges created from the leading tine and not to perform any kind of pressing operation. The Boards should not be set at too steep an angle and should have the appearance of skiing along the surface.

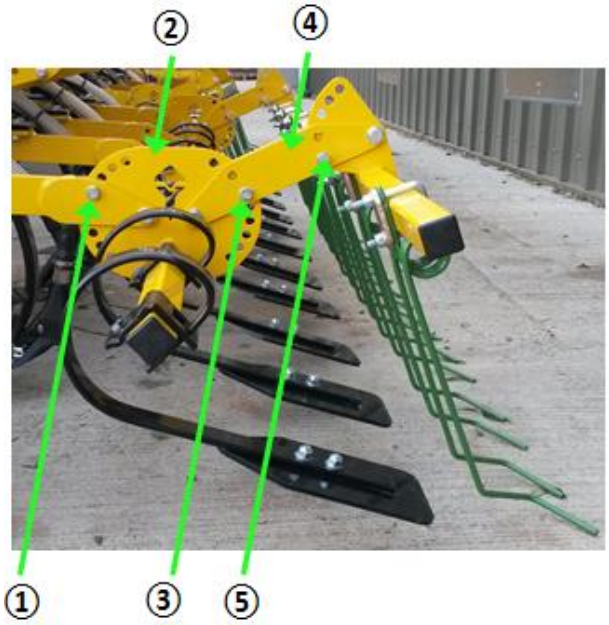
The green harrow tines may also be fitted to follow behind the levelling boards (Figure 46) or used as an alternative depending on the machine specification.



1. Green harrow tines
2. Level board
3. Level board/tine adjustment

Figure 46 – Level board

The level board angle is adjusted on the pin holes where the tool bar connects to the arms (Figure 47). The green harrow tines should be situated at an acute angle with the tail of the tine positioned firmly and parallel to the ground. This angle can be adjusted by altering the pin holes on the connecting arm (Figure 47). Figure 47 displays our suggested setting.

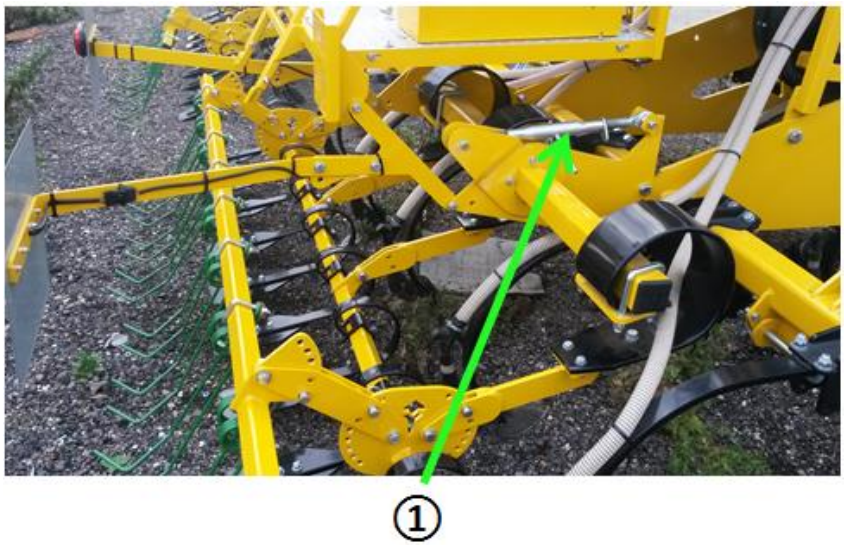


1. Remove pin to alter angle of ski boards
2. Rear tool bar
3. Remove pin to adjust height of green tines
4. Connecting arm for double tool bar
5. Remove pin to alter angle of green tines

Figure 47 – Ski boards and green tines adjustment settings

The level board height is altered on the adjuster located on the swivel beams (Figure 48). The levelling boards can be lifted completely out of work with this adjuster or have some downward pressure applied to them. Depending on the field conditions the following Ski board settings are recommended and should be achieved using the adjuster:

- **Wet conditions** - Remove pressure from ski boards
- **Dry conditions** - Apply pressure to ski boards
- **Ideal conditions** - Zero pressure (top link becomes loose during adjustment)



1. Level board adjuster

Figure 48 – Setting level board

Care and Maintenance

Lubricating Points

Lubrication should be performed by using multi-purpose grease. An overview of the greasing points for the 4m to 6m Hybrid drill is given in Figure 49 and Figure 50, an overview for the 3m hybrid is given in Figure 51, with identification numbers corresponding to the detail of lubricating points in Figure 52. Not all lubrications points apply to all machines and some are multiple lubrication points, so some identification numbers may not appear or may be repeated.

N.B. At regular intervals lubrication should also be placed on the drills top link pin to prevent excessive wear from the upper link ball.

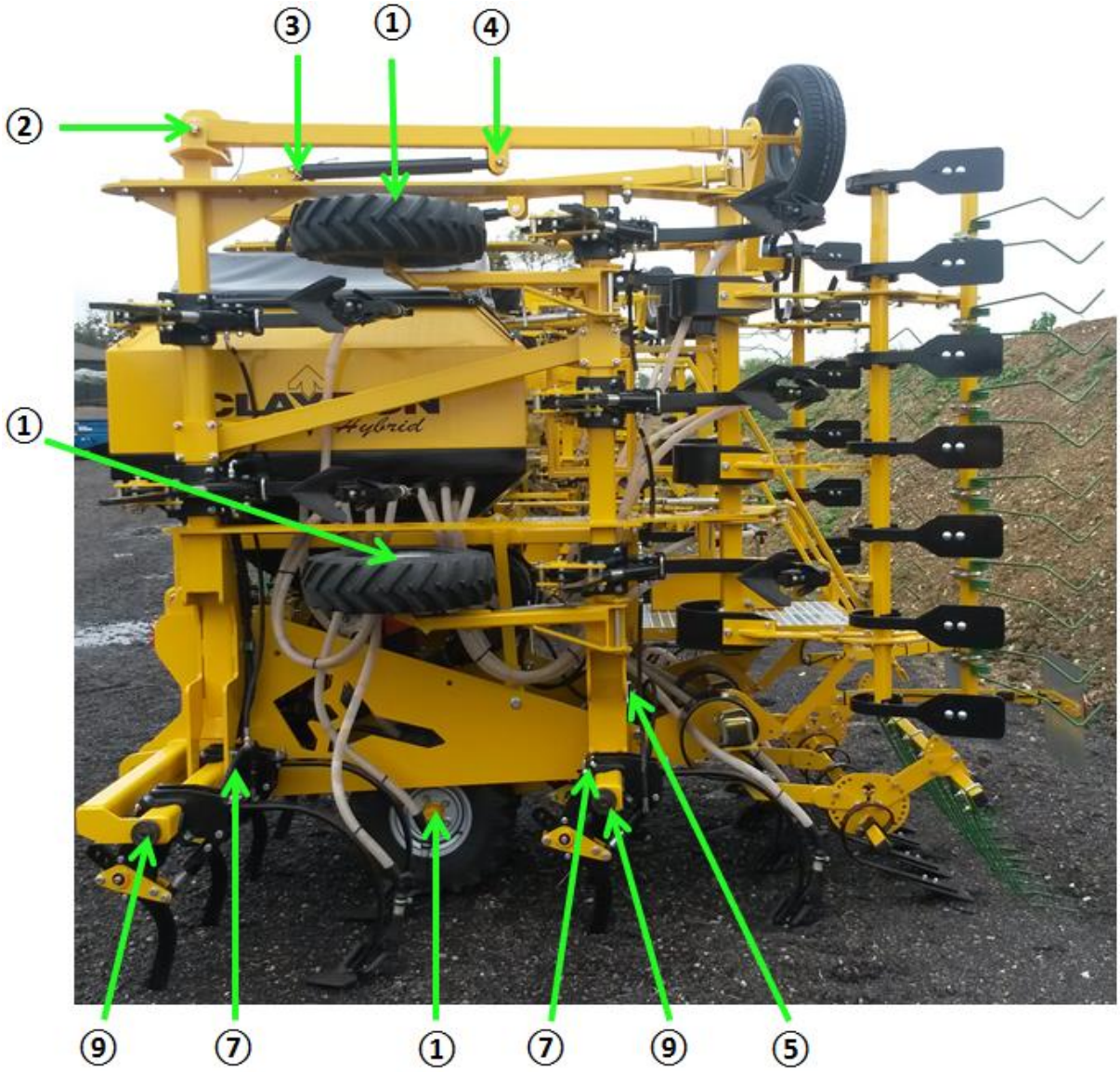


Figure 49 – Lubrication points, 4 to 6m Hybrid

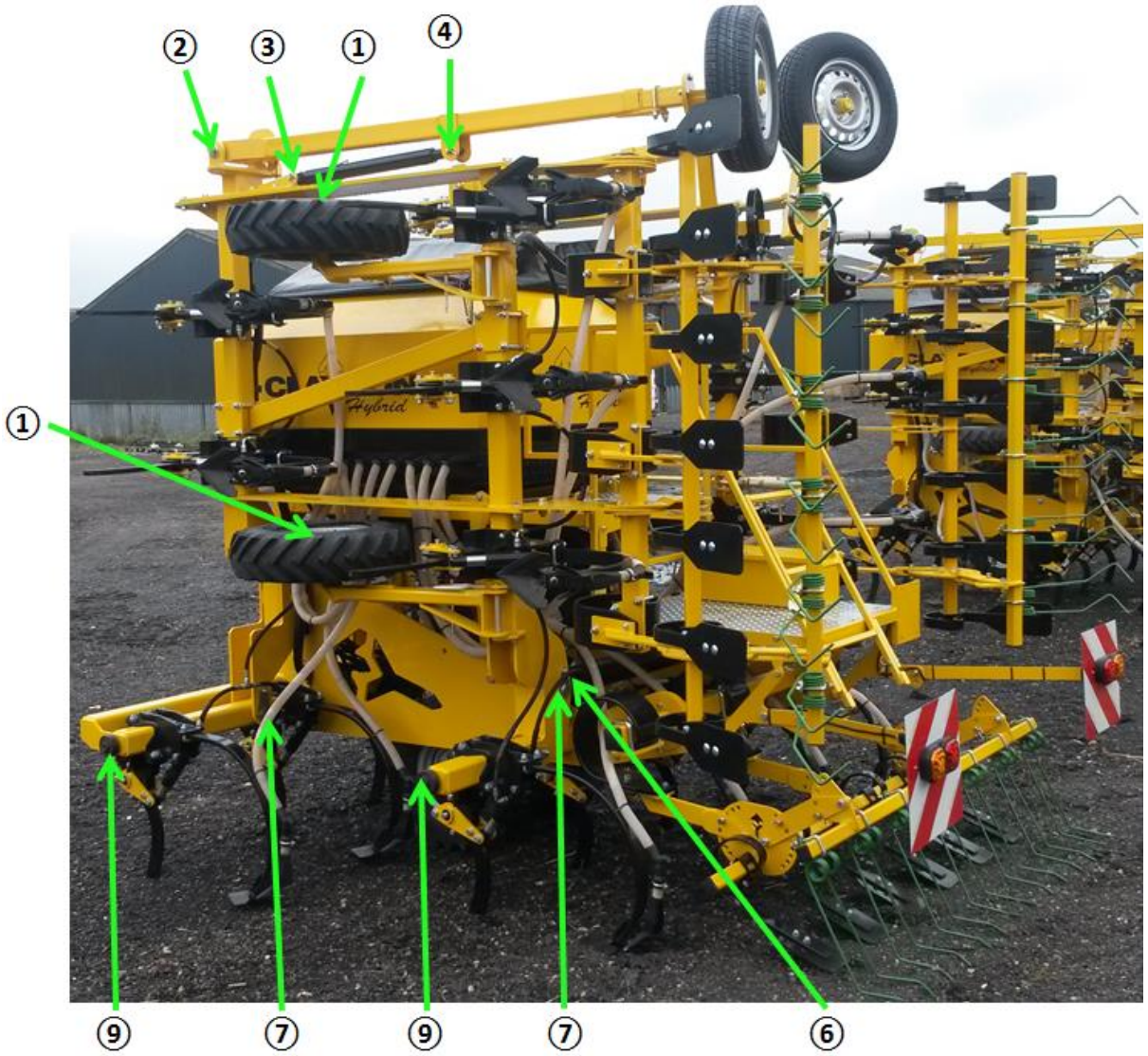


Figure 50 – Lubrication points, 4 to 6m Hybrid

Figure 51 – Lubrication points, 3m Hybrid drill overview

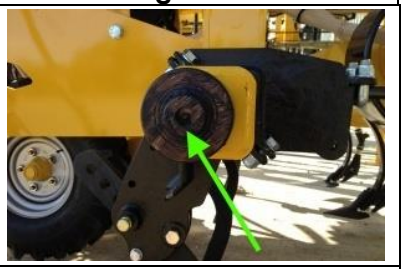
Lubrication Points to be Greased Daily		
1. Wheel hub	2. Marker arm pivot pin	3. Marker arm ram base
4. Marker arm ram rod end	5. Folding ram base end	6. Folding ram rod end
		
7. Folding pivot pin	8. Marker arm 3m Hybrid	9. Wings bearings 6m Hybrid

Figure 52 – Details of lubrication points

Changing Wearing Parts

Changing Front Tines

To change the front tine, simply remove the lynch clip and remove the 19mm pin, slide the entire tine out and replace the entire tine with a new one. Refit pin and lynch pin.

IF WORK IS REQUIRED TO BE CARRIED OUT WHILST THE DRILL IS RAISED, ENSURE A SUBSTANTIAL PROP IS POSITIONED SAFELY UNDER THE DRILL PREVENTING IT FALLING UNDER ITS OWN WEIGHT.

Removal

Replacement

Figure 53 – Changing front tines

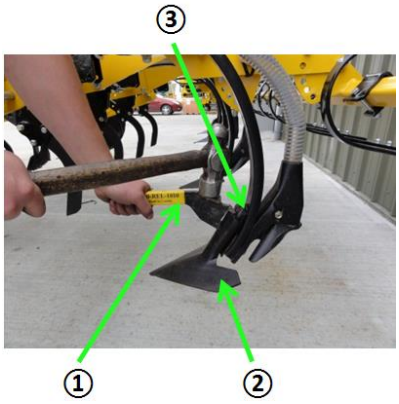
When new, the steel of the tine protrudes beyond the Tungsten, this is to protect the Tungsten when transporting new drills. After use the drill should be placed on wooden boards to protect the Tungsten. Great care needs to be taken when lowering the drills onto concrete.

Tyre Pressures

It is recommended that the wheels on the Hybrid seed drill should be inflated to a pressure of 30 psi (2 bar).

Changing Shares

On the seeding leg, hook the removal tool (supplied) over the top of the share and push the pin down, hit the top with a hammer to remove the share. Now simply slide the new share up the speed-Loc adaptor and hit the bottom with a hammer until the locking pin pushes back out. IF WORK IS REQUIRED TO BE CARRIED OUT WHILST THE DRILL IS RAISED, ENSURE A SUBSTANTIAL PROP IS POSITIONED SAFELY UNDER THE DRILL PREVENTING IT FALLING UNDER ITS OWN WEIGHT.



1. Speed-Loc tool
2. A-Share
3. Speed-Loc adapter

EYE PROTECTION MUST BE WORN

Figure 54 – Changing shares

NEVER HIT THE TUNGSTEN CARBIDE TILES WITH A HAMMER, WEAR GLOVES AND SAFETY GLASSES WHEN WORKING WITH THE TUNGSTEN CARBIDE PARTS. NEVER HIT THE LOCKING PIN WITH A HAMMER AND PUNCH OR ANYTHING SIMILAR AS THIS WILL DAMAGE THE SPRING.

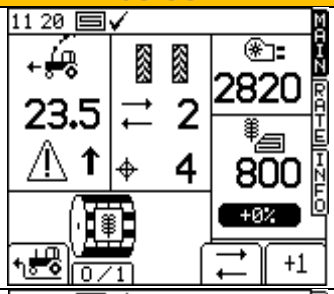
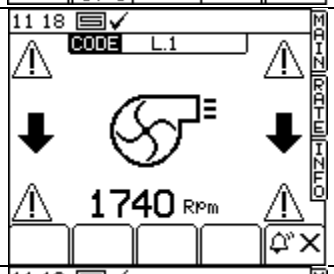
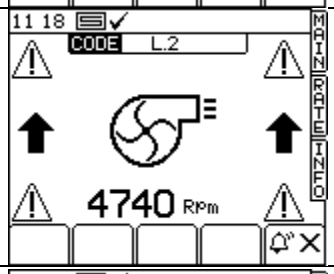
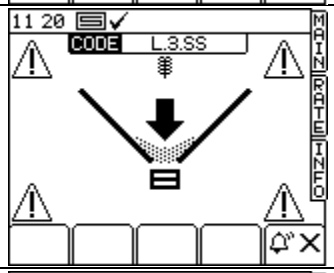
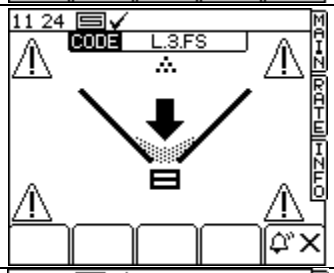
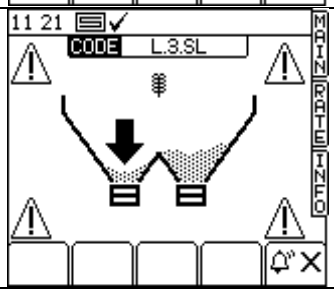
Changing Seed Boots

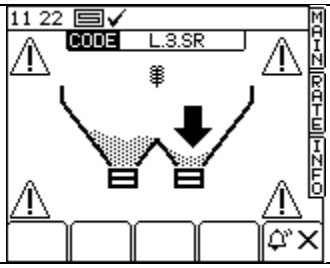
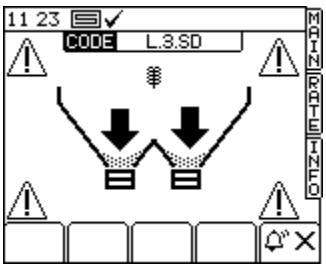
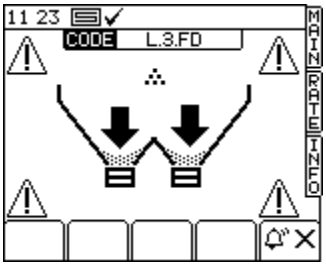
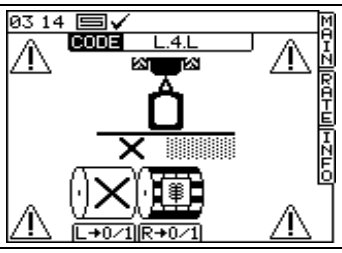
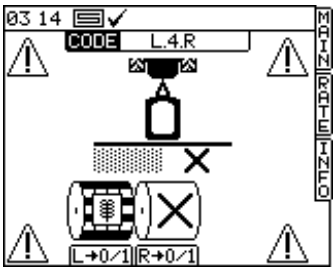
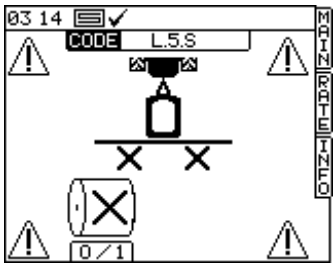
To remove and refit the seed boot undo the nut, remove the bolt and let the boot drop out of the boot holder, place new boot in holder and push bolt back into place, retighten the nut.

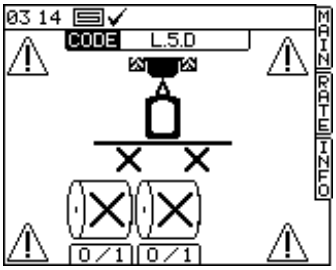
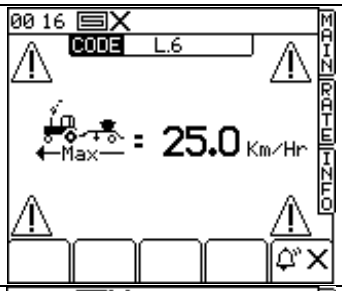
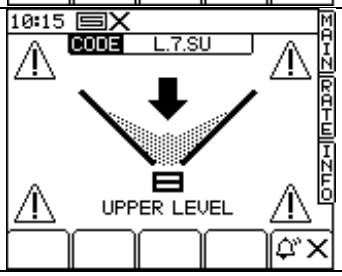
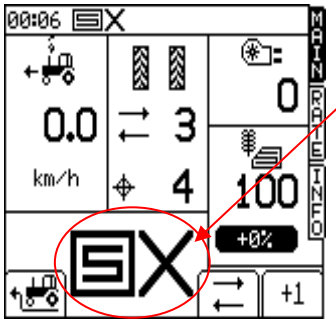
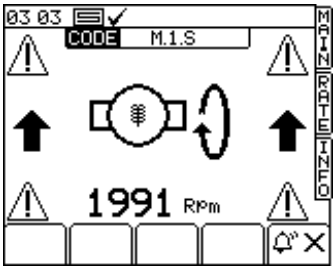
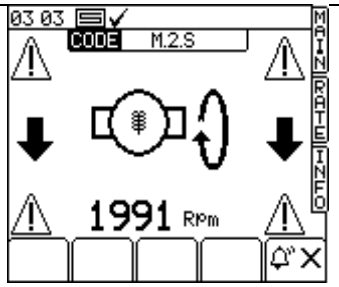
NB. Use 9/16" spanners.

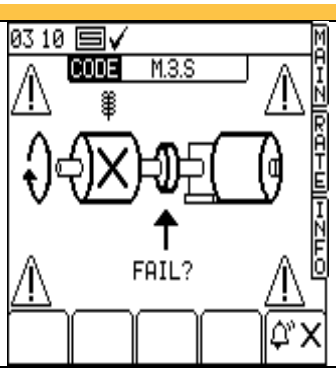
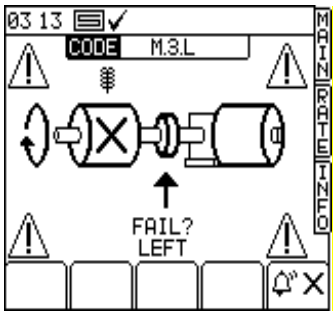
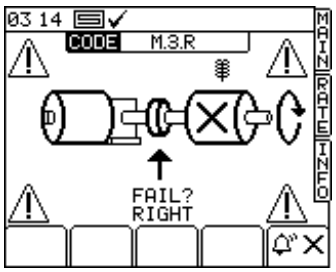
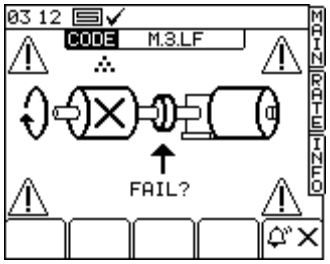
Figure 55 – Changing seeding boots

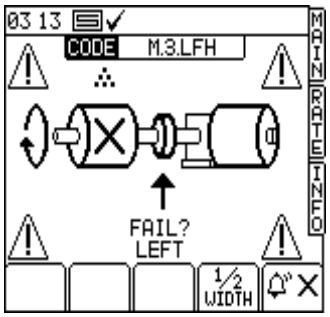
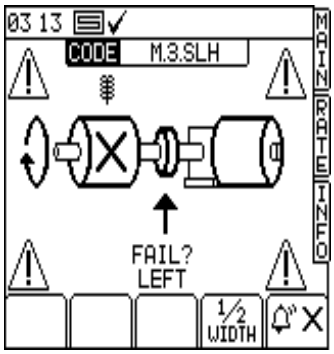
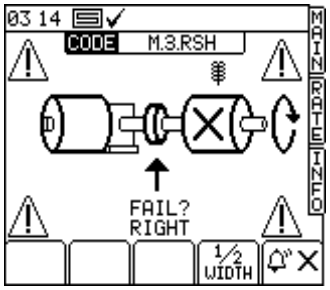
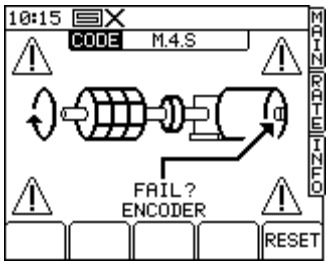
Appendix A - Artemis Fault Codes

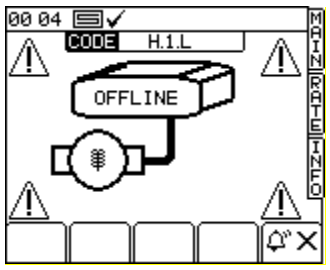
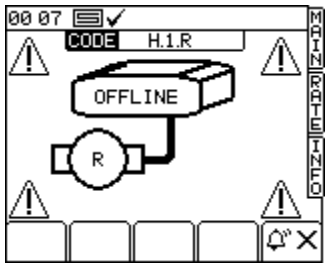
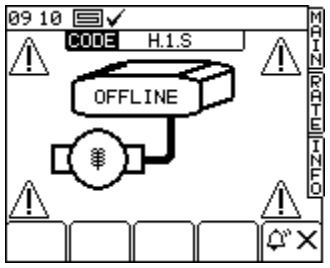
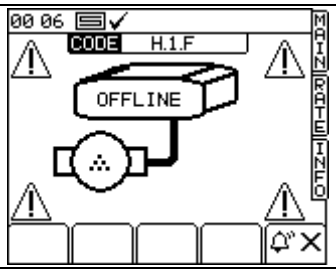
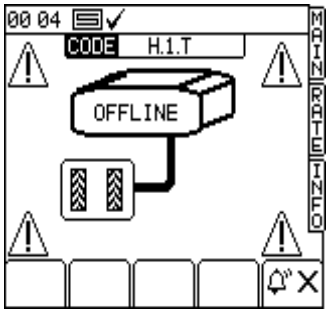
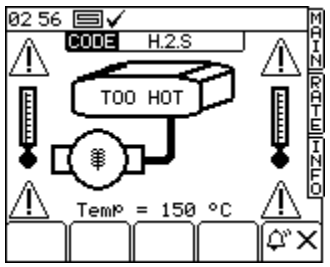
Code	Screen	Reason	Check?
N/A		High forward speed ▪ Forward speed exceeds the maximum calculated and displayed on the RATE screen	▪ Target application rate is as required ▪ Calibration factor is realistic ▪ Adjust metering unit and recalibrate which will increase kg/rev factor and therefore increase maximum achievable forward speed
L.1		Low fan speed ▪ Fan speed is below the low alarm value programmed	▪ Fan's actually operating ▪ Hydraulic flow from tractor ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly
L.2		High fan speed ▪ Fan speed is above the upper alarm value programmed	▪ Fan is actually operating ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Hydraulic flow from tractor
L.3.SS		Seed level is low *(Seed only or Seed & Fert drill, 1 metering unit per product)*	▪ Seed level is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
L.3.FS		Fert level is low *(Seed & Fert drill only, 1 metering unit per product)*	▪ Fert level is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
L.3.SL		Seed level left is low *(Seed only drill with 2 metering units, independent left & right level sensors)*	▪ Seed level left is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct

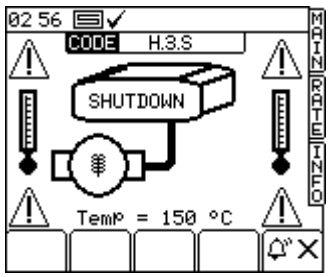
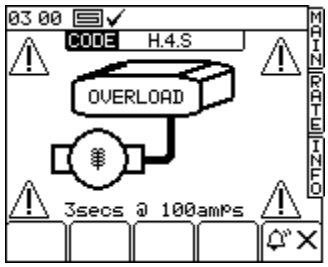
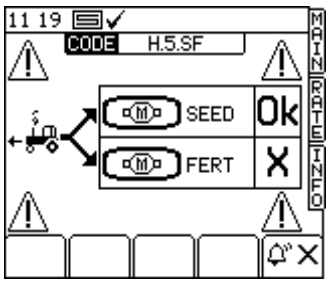
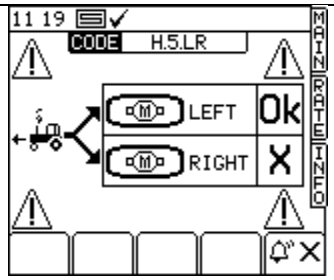
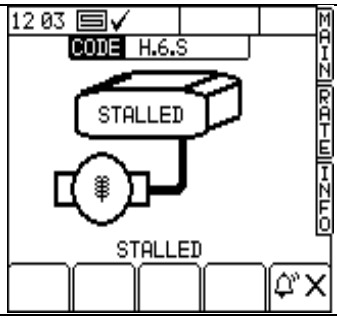
L.3.SR		Seed level right is low *(Seed only drill with 2 metering units, independent left & right level sensors)*	▪ Seed level right is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
L.3.SD		Both seed levels are low *(Seed only drill with 2 metering units, independent left & right level sensors)*	▪ Seed levels are actually low ▪ Sensors are functioning correctly ▪ Wiring between sensors and connection box is correct ▪ Wiring between connection box and CAN module is correct
L.3.FD		Fert level is low *(only Seed & Fert drill, 2 metering units per product)*	▪ Fert level is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
L.4.L		Half Width Enabled – Left Side *(only Seed drill, 2 metering units per product)*	▪ Left side motor is disabled due to pressing the on-screen motor inhibit button. ▪ Re-press to re-enable the motor or ignore to continue with half width drilling.
L.4.R		Half Width Enabled – Right Side *(only Seed drill, 2 metering units per product)*	▪ Right side motor is disabled due to pressing the on-screen motor inhibit button. ▪ Re-press to re-enable the motor or ignore to continue with half width drilling.
L.5.S		Single Motor Metering Off	▪ Motor is disabled due to pressing the on-screen motor inhibit button. ▪ Re-press to re-enable the motor or ignore to continue with the motor inhibited.

L.5.D		Dual Motor Metering Off	▪ Both motors are disabled due to pressing the on-screen motor inhibit buttons. ▪ Re-press to re-enable the motors or ignore to continue with the motors inhibited.
L.6		Max Forward Speed	▪ Based upon the calibration factor, this is the maximum speed that can be achieved. ▪ If this is too low then open the metering unit slide further and re-calibrate.
L.7.SU		Seed Level Upper is Low (Pre-Level)	▪ Seed level upper is actually low ▪ Sensor is functioning correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
N/A		Area cut-out ▪ Flashes up for 1 second every 3 seconds when system is 'out of work'	▪ Is drill still lifted ▪ Sensor & target/switch functioning and correct ▪ Spring toggle switch correctly set + operating ▪ Operating logic not set correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct
M.1.S		Seed motor speed high ▪ Error between actual motor speed and target motor speed is greater than 10%	▪ Target motor speed too low ▪ Erratic forward speed signal ▪ Erratic loading on motor via metering unit ▪ Check radar ▪ **Reduce Metering Unit Opening/Slide** ▪ **Re-calibrate**
M.2.S		Seed motor speed low ▪ Error between actual motor speed and target motor speed is greater than 10%	▪ Target motor speed to high ▪ Erratic forward speed signal ▪ Erratic loading on motor via metering unit ▪ Check radar ▪ **Increase Metering Unit Opening/Slide** ▪ **Re-calibrate**

M.3.S		Seed metering unit is not going around	▪ Is seed metering unit rotating when motor rotates ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.3.L		Left seed metering unit is not going around *(Seed only drill with 2 motors each driving 1 metering unit)*	▪ Is seed left metering unit rotating when motor rotates ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.3.R		Right seed metering unit is not going around *(Seed only drill with 2 motors each driving 1 metering unit)*	▪ Is right metering unit rotating when motor rotates ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.3.LF		Fert metering unit is not going around *(Seed & fert drill with 2 motors each driving 1 metering unit)*	▪ Is fert metering unit rotating when motor rotates ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is right ▪ Check sensor on metering unit

M.3.LFH		Left fert metering unit is not going around *(Seed & fert drill with 2 motors each driving 2 metering unit)*	▪ Is fert left metering unit rotating when motor rotates ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.3.SLH		Left seed metering unit is not going around *(Drill with 1 motor driving 2 metering units)*	▪ Is seed left metering unit rotating when motor rotates ▪ Is drill being operated at ½ width? ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.3.RSH		Right seed metering unit is not going around *(Drill with 1 motor driving 2 metering units)*	▪ Is seed right metering unit rotating when motor rotates ▪ Is drill being operated at ½ width? ▪ Sensor & target functioning and correct ▪ PPR value programmed correctly ▪ Wiring between sensor and connection box is correct ▪ Wiring between connection box and CAN module is correct ▪ Check sensor on metering unit
M.4.S		Motor speed signal from seed motor not being received Motor being operated and pulses received from shaft confirmation sensors but no motor speed signal	▪ Signs of mechanical damage to encoder or cabling on motor ▪ 3way connector between motor and harness is correct ▪ Wiring between 3way connector and module connector is correct

H.1.L		Left motor control module is 'offline'	▪ Check wiring between 6way connector and module connector on MCM harness ▪ If alarm M.3.L & H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.R		Right motor control module is 'offline'	▪ Check wiring between 6way connector and module connector on MCM harness ▪ If alarm L.7.SU & H.1.L also shown then check between 50way D connector on back of PSI and both 6way & 4way of instrument harness
H.1.S		Seed Motor Control Module is 'offline'	▪ Check wiring between 6way connector and module connector on MCM harness ▪ If alarm H.1.L also shown then check between 50way D connector on back of PSI and both 6way & 4way of instrument harness
H.1.F		Fert motor control module is 'offline'	▪ Check wiring between 6way connector and module connector on MCM harness ▪ If alarm L.4.R & H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.T		Tramline module is 'offline'	▪ Check module has got power from main battery power cable ▪ Check wiring between 4way connector and module connector on HBM harness ▪ If alarm L.4.R also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.2.S		Seed motor module temperature too hot Module temperature has exceeded the value programmed	▪ Motor speed very low ▪ Excessive load applied to motor which for a prolonged time has caused the high module temperature

H.3.S		Seed motor module temperature shutdown ▪ Module temperature has exceeded the value programmed	▪ Motor speed very low ▪ Excessive load applied to motor which for a prolonged time has caused the high module temperature
H.4.S		Seed motor module overload shutdown ▪ Motor current requirement exceeded so module shutdown and motor operation inhibited	▪ Motor stalled ▪ Excessive drag on the metering unit requiring high motor current
H.5.SF		Forward Speed Failure (Seed & Fert)	▪ Check wiring of forward speed in alarmed connection box. ▪ Check for continuity between pin 2A on MCM 1 (white wire) and pin 2A on MCM 2
H.5.LR		Forward Speed Failure (Left & Right)	▪ Check wiring of forward speed in alarmed connection box. ▪ Check for continuity between pin 2A on MCM 1 (white wire) and pin 2A on MCM 2
H.6.S		Motor has Stalled	▪ Check for blockages in the metering unit ▪ Disconnect motor from metering unit and ensure both units rotate separately. ▪ Check motor and gearbox. ▪ **Open and Close Finger Switch/Area Cut Out to Reset Alarm Criteria**

Appendix B – Declaration of Conformity

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

We Claydon Yieldometer Ltd

of Gaines Hall

in accordance with the following Directive(s):

2006/42/EC The Machinery Directive

hereby declare that:

Equipment Claydon Drills

Model number Hybrid

Serial Number

is in conformity with the applicable requirements of the following documents

Ref. No.	Title	Edition/ date
EN ISO 12100-1:2003	Safety of Machinery – Basic Concepts	2003
EN ISO 12100-2:2003	Safety of Machinery – Basic Concepts	2003

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications and is in accordance with the requirements of the Directive(s)

Signed by: .....

Name: Oliver Claydon

Position: Director of Design and Production

Done at
Gaines Hall
Wickhambrook

On
21/06/2012

The technical documentation for the machinery is available from:

Name: Claydon Yieldometer Ltd

Address: Gaines Hall
Wickhambrook
Newmarket
Suffolk
CB8 8YA

Appendix C – Metering Unit Slider Positions

Table 1 displayed where the slider on the metering unit should be positioned when sowing seed with a **3m** Hybrid seed drill. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed, e.g. If wheat was required to be sown at 246 Kg/Ha, the slider on the metering unit would be set at 50 on a 3m drill, highlighted below.

Table 1 – Metering unit slider positions for a 3m Hybrid Drill

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT											SMALL SEED SETTING - RED LOCKING TAP IN HEXAGON SHAFT GROOVE			
English	Wheat	Rye	Barley	Oats	Beans	Peas	Lupins	Vetches	Maize	Grass	Oilseed Rape	Red Clover	Grass	Turnip
Italian	Grano	Segale	Orzo	Avena	Fagioli	Piselli	Lupini	Vecce	Mais	Erba	Colza	Trifoglio Rosso	Erba	Rapa
Dutch	Tarwe	Rogge	Gerst	Haver	Veldbonen	Erwten	Lupinen	Wikke	Maïs	Gras	Koolzaad	Rode Klaver	Gras	Knolraap
Spanish	Trigo	Centeno	Cebada	Avena	Frijoles	Chicharos	Lupino	Vezas	Maíz	Hierba	Colza	Trébol Rojo	Hierba	Nabo
Swedish	Vete	Råg	Korn	Havre	Bönor	Ärtor	Lupine	Vicker	Majs	Gräsfrö	Raps	Rödklöver	Gräsfrö	Kålrot
Danish	Hvede	Rug	Byg	Havre	Bønner	Ærter	Lupiner	Vikker	Majs	Græsfrø	Raps	Rødkløver	Græsfrø	Majroe
German	Weizen	Roggen	Gerste	Hafer	Bohnen	Erbsen	Lupinen	Wicken	Mais	Grassamen	Raps	Rotklee	Grassamen	Rübe
French	Blé	Seigle	Orge	Avoine	Haricots	Poi	Lupine	Vesce	Maïs	Gazon	Colza	Trèfle Rouge	Gazon	Navet
Polish	Pszenica	Żyto	Jęczmień	Owies	Fasola	Groszek	Łubin	Wyki	Kukurydza	Trawy	Rzepak	Koniczyna Czerwona	Trawy	Rzepa
Czech	Pšenice	Žito	Ječmen	Oves	Fazole	Hrášek	Lupina	Vikve	Kukuřice	Travní	Řepka	Červený Jetel	Travní	Tuřín
Relative density	0.77	0.74	0.68	0.5	0.85	0.81	0.76	0.83	0.79	0.36	0.77	0.74	0.68	0.5
Drill width (m)	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Slider Setting	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha
10	48	47	45	34	32	30	40	45	11	0	2.3	2.4	0.0	2.6
15	72	69	68	49	59	56	64	72	34	25	4.9	5.6	0.0	5.3
20	97	93	90	66	86	83	88	99	66	37	7.2	9.1	3.0	7.9
25	121	117	112	83	112	110	112	126	99	48	9.6	12.7	5.5	10.6
30	147	141	134	100	138	137	136	152	130	59	12.1	16.2	7.6	13.2
35	172	165	157	116	164	165	160	179	162	71	14.5	19.1	9.7	15.9
40	198	189	179	133	191	192	184	206	193		16.8	22.6	11.9	18.5
45	222	213	202	150	217	219	208	233	220		19.3	25.4	14.0	21.2
50	246	237	224	167	243	246	232	260	247		21.7	28.2	15.9	22.8
55	271	260	246	184	270	274	256	287	274		24.1	29.1	17.2	24.4
60	296	282	268	199	295	301	280	313	299					
65	322	306	291	216	322	328	305	340	326					
70	347	332	313	233	347	354	330	367	352					
75	373	356	336	250	374	381	354	394	377					
80	397	380	357	267	400	408	378	421	402					
85	421	404	378	282	426	436	402	448	429					
90	446	426	401	299	452	463	426	474	456					
95	473	450	424	316	477	490	452	501	483					
100	497	476	446	333	503	517	476	528	510					
105	522	500	469	350	528	544	500	555	536					
110	546	524	491	367	555	570	524	582	562					

Table 2 displayed where the slider on the metering unit should be positioned when sowing seed with a **4m** Hybrid seed drill. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed, e.g. If wheat was required to be sown at 241 Kg/Ha, the slider on the metering unit would be set at 65 on a 4m drill, highlighted below.

Table 2 – Metering unit slider positions for a 4m Hybrid Drill

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT												SMALL SEED SETTING - RED LOCKING TAP IN HEXAGON SHAFT GROOVE			
English	Wheat	Rye	Barley	Oats	Beans	Fertiliser	Peas	Lupins	Vetches	Maize	Grass	Oilseed Rape	Red Clover	Grass	Turnip
Italian	Gràno	Sègale	Òrzo	Avèna	Fagiòli	Fertilizzante	Pisèlli	Lupini	Vècce	Mais	Èrba	Còlza	Trifoglio Rosso	Èrba	Ràpa
Dutch	Tarwe	Rogge	Gerst	Haver	Veldbonen	Meststof	Erwten	Lupinen	Wikke	Maïs	Gras	Koolzaad	Rode Klaver	Gras	Knolraap
Spanish	Trigo	Centeno	Cebada	Avena	Frijoles	Fertilizante	Chicharos	Lupino	Vezas	Maíz	Hierba	Colza	Trébol Rojo	Hierba	Nabo
Swedish	Vete	Råg	Korn	Havre	Bönor	Gödningsmedel	Ärtor	Lupine	Vicker	Majs	Gräsfrö	Raps	Rödklöver	Gräsfrö	Kålrot
Danish	Hvede	Rug	Byg	Havre	Bønner	Gødning	Ærter	Lupiner	Vikker	Majs	Græsfrø	Raps	Rødkløver	Græsfrø	Majroe
German	Weizen	Roggen	Gerste	Hafer	Bohnen	Dünger	Erbsen	Lupinen	Wicken	Mais	Grassamen	Raps	Rotklee	Grassamen	Rübe
French	Blé	Seigle	Orge	Avoine	Haricots	Engrais	Poi	Lupine	Vesce	Maïs	Gazon	Colza	Trèfle Rouge	Gazon	Navet
Polish	Pszenica	Żyto	Jęczmień	Owies	Fasola	Zapylaczka	Groszek	Łubin	Wyki	Kukurydza	Trawy	Rzepak	Koniczyna Czerwona	Trawy	Rzepa
Czech	Pšenice	Žito	Ječmen	Oves	Fazole	hnojivo	Hrášek	Lupina	Vikve	Kukuřice	Travní	Řepka	Červený Jetel	Travní	Turín
Relative density Kg/l	0.77	0.74	0.68	0.5	0.85	1	0.81	0.76	0.83	0.79	0.36	0.77	0.74	0.68	0.5
Drill width (m)	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
Slider Setting	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**
10	36	35	34	25	24	48	22	30	34	8	0	1.7	1.8	0.0	2.0
15	54	52	51	37	44	72	42	48	54	25	19	3.7	4.2	0.0	4.0
20	73	70	68	50	65	95	62	66	74	50	28	5.4	6.8	2.2	6.0
25	91	88	84	62	84	119	83	84	94	74	36	7.2	9.5	4.1	7.9
30	110	106	101	75	104	143	103	102	114	97	44	9.1	12.2	5.7	9.9
35	129	124	118	87	123	167	124	120	134	122	53	10.9	14.3	7.3	11.9
40	148	142	134	100	143	191	144	138	155	145		12.6	16.9	8.9	13.9
45	166	160	151	112	163	215	164	156	175	165		14.5	19.1	10.5	15.9
50	184	178	168	125	182	239	184	174	195	185		16.3	21.1	11.9	17.1
55	203	195	184	138	202	262	205	192	215	205		18.1	21.8	12.9	18.3
60	222	212	201	149	221	286	226	210	235	224					
65	241	230	218	162	241	310	246	229	255	245					
70	260	249	235	175	260	334	266	248	275	264					
75	280	267	252	187	281	358	286	266	295	283					
80	298	285	268	200	300	382	306	284	316	302					
85	316	303	284	212	320	405	327	302	336	322					
90	335	320	301	224	339	429	347	320	356	342					
95	355	338	318	237	358	453	367	339	376	362					
100	373	357	335	250	377	477	388	357	396	382					
105	392	375	352	263	396	501	408	375	416	402					
110	410	393	368	275	416	525	428	393	436	421					

Table 3 displayed where the slider on the metering unit should be positioned when sowing seed with a **4.8m** Hybrid seed drill. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed, e.g. If wheat was required to be sown at 263 Kg/Ha, the slider on the metering unit would be set at 85 on a 4.8m drill, highlighted below.

Table 3 – Metering unit slider positions for a 4.8m Hybrid Drill

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT												SMALL SEED SETTING - RED LOCKING TAP IN HEXAGON SHAFT GROOVE			
English	Wheat	Rye	Barley	Oats	Beans	Fertiliser	Peas	Lupins	Vetches	Maize	Grass	Oilseed Rape	Red Clover	Grass	Turnip
Italian	Grànо	Sègale	Òrzo	Avèna	Fagiòli	Fertilizzante	Pisèlli	Lupìni	Vècce	Mais	Èrba	Còlza	Trifoglio Rosso	Èrba	Ràpa
Dutch	Tarwe	Rogge	Gerst	Haver	Veldbonen	Meststof	Erwten	Lupinen	Wikke	Maïs	Gras	Koolzaad	Rode Klaver	Gras	Knolraap
Spanish	Trigo	Centeno	Cebada	Avena	Frijoles	Fertilizante	Chicharos	Lupino	Vezas	Maíz	Hierba	Colza	Trébol Rojo	Hierba	Nabo
Swedish	Vete	Råg	Korn	Havre	Bönor	Gödningsmedel	Ärtor	Lupine	Vicker	Majs	Gräsfrö	Raps	Rödklöver	Gräsfrö	Kålrot
Danish	Hvede	Rug	Byg	Havre	Bønner	Gødning	Ærter	Lupiner	Vikker	Majs	Græsfrø	Raps	Rødkløver	Græsfrø	Majroe
German	Weizen	Roggen	Gerste	Hafer	Bohnen	Dünger	Erbsen	Lupinen	Wicken	Mais	Grassamen	Raps	Rotklee	Grassamen	Rübe
French	Blé	Seigle	Orge	Avoine	Haricots	Engrais	Poi	Lupine	Vesce	Maïs	Gazon	Colza	Trèfle Rouge	Gazon	Navet
Polish	Pszenica	Żyto	Jęczmień	Owies	Fasola	Zapylaczka	Groszek	Łubin	Wyki	Kukurydza	Trawy	Rzepak	Koniczyna Czerwona	Trawy	Rzepa
Czech	Pšenice	Žito	Ječmen	Oves	Fazole	hnojivo	Hrášek	Lupina	Vikve	Kukuřice	Travní	Řepka	Červený Jetel	Travní	Tuřín
Relative density Kg/l	0.77	0.74	0.68	0.5	0.85	1	0.81	0.76	0.83	0.79	0.36	0.77	0.74	0.68	0.5
Drill width (m)	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**	**4.8**
Slider Setting	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**
10	30	29	28	21	20	40	19	25	28	7	0	1.5	1.5	0.0	1.7
15	45	43	42	31	37	60	35	40	45	21	16	3.0	3.5	0.0	3.3
20	61	58	56	41	54	80	52	55	62	41	23	4.5	5.7	1.9	5.0
25	76	73	70	52	70	99	69	70	79	62	30	6.0	7.9	3.4	6.6
30	92	88	84	63	86	119	86	85	95	81	37	7.5	10.1	4.8	8.3
35	108	103	98	72	102	139	103	100	112	101	44	9.1	11.9	6.1	9.9
40	124	118	112	83	119	159	120	115	129	121		10.5	14.1	7.4	11.6
45	139	133	126	94	136	179	137	130	146	138		12.0	15.9	8.7	13.2
50	154	148	140	104	152	199	154	145	162	154		13.6	17.6	9.9	14.2
55	169	162	154	115	169	219	171	160	179	171		15.1	18.2	10.7	15.2
60	185	176	168	124	184	239	188	175	196	187					
65	201	191	182	135	201	258	205	191	213	204					
70	217	207	196	146	217	278	221	206	229	220					
75	233	222	210	156	234	298	238	221	246	236					
80	248	237	223	167	250	318	255	236	263	251					
85	263	252	236	176	266	338	273	251	280	268					
90	279	266	251	187	282	358	289	266	296	285					
95	296	281	265	198	298	378	306	282	313	302					
100	311	297	279	208	314	398	323	297	330	319					
105	326	312	293	219	330	417	340	312	347	335					
110	341	327	307	229	347	437	356	327	364	351					

Table 4 displayed where the slider on the metering unit should be positioned when sowing seed with a **6m** Hybrid seed drill. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed, e.g. If wheat was required to be sown at 236 Kg/Ha, the slider on the metering unit would be set at 95 on a 6m drill, highlighted below.

Table 4 – Metering unit slider positions for a 6m Hybrid Drill

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT												SMALL SEED SETTING - RED LOCKING TAP IN HEXAGON SHAFT GROOVE			
English	Wheat	Rye	Barley	Oats	Beans	Fertiliser	Peas	Lupins	Vetches	Maize	Grass	Oilseed Rape	Red Clover	Grass	Turnip
Italian	Gràno	Sègale	Òrzo	Avèna	Fagiòli	Fertilizzante	Pisèlli	Lupini	Vècce	Mais	Èrba	Còlza	Trifoglio Rosso	Èrba	Ràpa
Dutch	Tarwe	Rogge	Gerst	Haver	Veldbonen	Meststof	Erwten	Lupinen	Wikke	Maïs	Gras	Koolzaad	Rode Klaver	Gras	Knolraap
Spanish	Trigo	Centeno	Cebada	Avena	Frijoles	Fertilizante	Chicharos	Lupino	Vezas	Maíz	Hierba	Colza	Trébol Rojo	Hierba	Nabo
Swedish	Vete	Råg	Korn	Havre	Bönor	Gödningsmedel	Ärtor	Lupine	Vicker	Majs	Gräsfrö	Raps	Rödklöver	Gräsfrö	Kålrot
Danish	Hvede	Rug	Byg	Havre	Bønner	Gødning	Ærter	Lupiner	Vikker	Majs	Græsfrø	Raps	Rødkløver	Græsfrø	Majroe
German	Weizen	Roggen	Gerste	Hafer	Bohnen	Dünger	Erbsen	Lupinen	Wicken	Mais	Grassamen	Raps	Rotklee	Grassamen	Rübe
French	Blé	Seigle	Orge	Avoine	Haricots	Engrais	Poi	Lupine	Vesce	Maïs	Gazon	Colza	Trèfle Rouge	Gazon	Navet
Polish	Pszenica	Żyto	Jęczmień	Owies	Fasola	Zapylaczka	Groszek	Łubin	Wyki	Kukurydza	Trawy	Rzepak	Koniczyna Czerwona	Trawy	Rzepa
Czech	Pšenice	Žito	Ječmen	Oves	Fazole	hnojivo	Hrášek	Lupina	Vikve	Kukuřice	Travní	Řepka	Červený Jetel	Travní	Tuřín
Relative density Kg/l	0.77	0.74	0.68	0.5	0.85	1	0.81	0.76	0.83	0.79	0.36	0.77	0.74	0.68	0.5
Drill width (m)	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Slider Setting	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**	**Kg/Ha**
10	24	23	23	17	16	32	15	20	23	6	0	1.2	1.2	0.0	1.3
15	36	35	34	25	30	48	28	32	36	17	13	2.4	2.8	0.0	2.6
20	49	47	45	33	43	64	42	44	49	33	18	3.6	4.6	1.5	4.0
25	61	59	56	42	56	80	55	56	63	49	24	4.8	6.4	2.8	5.3
30	73	71	67	50	69	95	68	68	76	65	30	6.0	8.1	3.8	6.6
35	86	83	78	58	82	111	83	80	90	81	35	7.3	9.5	4.9	7.9
40	99	95	90	66	95	127	96	92	103	97		8.4	11.3	5.9	9.3
45	111	107	101	75	109	143	109	104	116	110		9.6	12.7	7.0	10.6
50	123	119	112	83	121	159	123	116	130	124		10.9	14.1	7.9	11.4
55	136	130	123	92	135	175	137	128	143	137		12.1	14.6	8.6	12.2
60	148	141	134	100	148	191	150	140	157	150					
65	161	153	145	108	161	207	164	152	170	163					
70	174	166	157	116	174	223	177	165	184	176					
75	186	178	168	125	187	239	191	177	197	188					
80	198	190	179	133	200	254	204	189	210	201					
85	210	202	189	141	213	270	218	201	224	215					
90	223	213	200	150	226	286	232	213	237	228					
95	236	225	212	158	239	302	245	226	251	241					
100	248	238	223	167	251	318	258	238	264	255					
105	261	250	234	175	264	334	272	250	277	268					
110	273	262	246	184	277	350	285	262	291	281					

Appendix D – Calibration Factors

Once the "Cal. Factor" value has been obtained from the calibration check procedure, the figure can then be compared with the results below; all the values within this section apply to **large seeds** only.

Firstly select the correct product (large seeds continue on following page), then locate the nearest application rate (Kg/Ha) followed by the drill width. The corresponding "Cal Factor" (Kg/rev) can then be compared to the value displayed on the Artemis control box. Although the values may not be an exact match, the figures should be within the same region, if not a recalibration may be required, e.g. If a 3m Hybrid drill containing Wheat was calibrated to apply 121Kg/Ha, the Artemis unit would display a Cal Factor of approximately 0.101 Kg/rev, shown below.

English Italian Dutch Spanish Swedish Danish German French Polish Czech	Wheat Grano Tarwe Trigo Vete Hvede Weizen Blé Pszenica Pšenice	Wheat Grano Tarwe Trigo Vete Hvede Weizen Blé Pszenica Pšenice	Wheat Grano Tarwe Trigo Vete Hvede Weizen Blé Pszenica Pšenice	Wheat Grano Tarwe Trigo Vete Hvede Weizen Blé Pszenica Pšenice
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.040	48	36	30	24
0.060	72	54	45	36
0.081	97	73	61	49
0.101	121	91	76	61
0.122	147	110	92	73
0.144	172	129	108	86
0.165	198	148	124	99
0.185	222	166	139	111
0.205	246	184	154	123
0.226	271	203	169	136
0.247	296	222	185	148
0.268	322	241	201	161
0.289	347	260	217	174
0.311	373	280	233	186
0.331	397	298	248	198
0.351	421	316	263	210
0.372	446	335	279	223
0.394	473	355	296	236
0.414	497	373	311	248
0.435	522	392	326	261
0.455	546	410	341	273

English Italian Dutch Spanish Swedish Danish German French Polish Czech	Rye Segale Rogge Centeno Råg Rug Roggen Seigle Żyto Žito	Rye Segale Rogge Centeno Råg Rug Roggen Seigle Żyto Žito	Rye Segale Rogge Centeno Råg Rug Roggen Seigle Żyto Žito	Rye Segale Rogge Centeno Råg Rug Roggen Seigle Żyto Žito
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.039	47	35	29	23
0.058	69	52	43	35
0.078	93	70	58	47
0.098	117	88	73	59
0.118	141	106	88	71
0.138	165	124	103	83
0.158	189	142	118	95
0.178	213	160	133	107
0.198	237	178	148	119
0.216	260	195	162	130
0.235	282	212	176	141
0.255	306	230	191	153
0.276	332	249	207	166
0.296	356	267	222	178
0.316	380	285	237	190
0.336	404	303	252	202
0.355	426	320	266	213
0.375	450	338	281	225
0.396	476	357	297	238
0.416	500	375	312	250
0.436	524	393	327	262

English Italian Dutch Spanish Swedish Danish German French Polish Czech	Barley Òrzo Gerst Cebada Korn Byg Gerste Orge Jęczmień Ječmen	Barley Òrzo Gerst Cebada Korn Byg Gerste Orge Jęczmień Ječmen	Barley Òrzo Gerst Cebada Korn Byg Gerste Orge Jęczmień Ječmen	Barley Òrzo Gerst Cebada Korn Byg Gerste Orge Jęczmień Ječmen
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.038	45	34	28	23
0.056	68	51	42	34
0.075	90	68	56	45
0.093	112	84	70	56
0.112	134	101	84	67
0.131	157	118	98	78
0.149	179	134	112	90
0.168	202	151	126	101
0.187	224	168	140	112
0.205	246	184	154	123
0.224	268	201	168	134
0.242	291	218	182	145
0.261	313	235	196	157
0.280	336	252	210	168
0.298	357	268	223	179
0.315	378	284	236	189
0.334	401	301	251	200
0.353	424	318	265	212
0.372	446	335	279	223
0.391	469	352	293	234
0.409	491	368	307	246

English Italian Dutch Spanish Swedish Danish German French Polish Czech	Oats Avèna Haver Avena Havre Havre Hafer Avoine Owies Oves	Oats Avèna Haver Avena Havre Havre Hafer Avoine Owies Oves	Oats Avèna Haver Avena Havre Havre Hafer Avoine Owies Oves	Oats Avèna Haver Avena Havre Havre Hafer Avoine Owies Oves
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.028	34	25	21	17
0.041	49	37	31	25
0.055	66	50	41	33
0.069	83	62	52	42
0.084	100	75	63	50
0.096	116	87	72	58
0.111	133	100	83	66
0.125	150	112	94	75
0.139	167	125	104	83
0.153	184	138	115	92
0.166	199	149	124	100
0.180	216	162	135	108
0.194	233	175	146	116
0.208	250	187	156	125
0.222	267	200	167	133
0.235	282	212	176	141
0.249	299	224	187	150
0.264	316	237	198	158
0.278	333	250	208	167
0.292	350	263	219	175
0.306	367	275	229	184

English Italian Dutch Spanish Swedish Danish German French Polish Czech	Beans Fagioli Veldbonen Frijoles Bönor Bønner Bohnen Haricots Fasola Fazole	Beans Fagioli Veldbone Frijoles Bönor Bønner Bohnen Haricots Fasola Fazole	Beans Fagioli Veldbonen Frijoles Bönor Bønner Bohnen Haricots Fasola Fazole	Beans Fagioli Veldbone Frijoles Bönor Bønner Bohnen Haricots Fasola Fazole
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.027	32	24	20	16
0.049	59	44	37	30
0.072	86	65	54	43
0.093	112	84	70	56
0.115	138	104	86	69
0.136	164	123	102	82
0.159	191	143	119	95
0.181	217	163	136	109
0.202	243	182	152	121
0.225	270	202	169	135
0.246	295	221	184	148
0.268	322	241	201	161
0.289	347	260	217	174
0.312	374	281	234	187
0.333	400	300	250	200
0.355	426	320	266	213
0.376	452	339	282	226
0.398	477	358	298	239
0.419	503	377	314	251
0.440	528	396	330	264
0.462	555	416	347	277

English	Peas	Peas	Peas	Peas
Italian	Pisèlli	Pisèlli	Pisèlli	Pisèlli
Dutch	Erwten	Erwten	Erwten	Erwten
Spanish	Chicharos	Chicharo	Chicharo	Chicharo
Swedish	Ärtor	Ärtor	Ärtor	Ärtor
Danish	Ærter	Ærter	Ærter	Ærter
German	Erbsen	Erbsen	Erbsen	Erbsen
French	Poi	Poi	Poi	Poi
Polish	Groszek	Groszek	Groszek	Groszek
Czech	Hrášek	Hrášek	Hrášek	Hrášek
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.025	30	22	19	15
0.047	56	42	35	28
0.069	83	62	52	42
0.092	110	83	69	55
0.114	137	103	86	68
0.138	165	124	103	83
0.160	192	144	120	96
0.182	219	164	137	109
0.205	246	184	154	123
0.228	274	205	171	137
0.251	301	226	188	150
0.273	328	246	205	164
0.295	354	266	221	177
0.318	381	286	238	191
0.340	408	306	255	204
0.364	436	327	273	218
0.386	463	347	289	232
0.408	490	367	306	245
0.431	517	388	323	258
0.453	544	408	340	272
0.475	570	428	356	285

English	Lupins	Lupins	Lupins	Lupins
Italian	Lupìni	Lupìni	Lupìni	Lupìni
Dutch	Lupinen	Lupinen	Lupinen	Lupinen
Spanish	Lupino	Lupino	Lupino	Lupino
Swedish	Lupine	Lupine	Lupine	Lupine
Danish	Lupiner	Lupiner	Lupiner	Lupiner
German	Lupinen	Lupinen	Lupinen	Lupinen
French	Lupine	Lupine	Lupine	Lupine
Polish	Łubin	Łubin	Łubin	Łubin
Czech	Lupina	Lupina	Lupina	Lupina
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.033	40	30	25	20
0.053	64	48	40	32
0.073	88	66	55	44
0.093	112	84	70	56
0.113	136	102	85	68
0.133	160	120	100	80
0.153	184	138	115	92
0.173	208	156	130	104
0.193	232	174	145	116
0.213	256	192	160	128
0.233	280	210	175	140
0.254	305	229	191	152
0.275	330	248	206	165
0.295	354	266	221	177
0.315	378	284	236	189
0.335	402	302	251	201
0.355	426	320	266	213
0.376	452	339	282	226
0.396	476	357	297	238
0.416	500	375	312	250
0.436	524	393	327	262

English	Vetches	Vetches	Vetches	Vetches
Italian	Vècce	Vècce	Vècce	Vècce
Dutch	Wikke	Wikke	Wikke	Wikke
Spanish	Vezas	Vezas	Vezas	Vezas
Swedish	Vicker	Vicker	Vicker	Vicker
Danish	Vikker	Vikker	Vikker	Vikker
German	Wicken	Wicken	Wicken	Wicken
French	Vesce	Vesce	Vesce	Vesce
Polish	Wyki	Wyki	Wyki	Wyki
Czech	Vikve	Vikve	Vikve	Vikve
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.038	45	34	28	23
0.060	72	54	45	36
0.082	99	74	62	49
0.105	126	94	79	63
0.127	152	114	95	76
0.149	179	134	112	90
0.172	206	155	129	103
0.194	233	175	146	116
0.216	260	195	162	130
0.239	287	215	179	143
0.261	313	235	196	157
0.284	340	255	213	170
0.306	367	275	229	184
0.328	394	295	246	197
0.351	421	316	263	210
0.373	448	336	280	224
0.395	474	356	296	237
0.418	501	376	313	251
0.440	528	396	330	264
0.462	555	416	347	277
0.485	582	436	364	291

English	Maize	Maize	Maize	Maize
Italian	Mais	Mais	Mais	Mais
Dutch	Maïs	Maïs	Maïs	Maïs
Spanish	Maíz	Maíz	Maíz	Maíz
Swedish	Majs	Majs	Majs	Majs
Danish	Majs	Majs	Majs	Majs
German	Mais	Mais	Mais	Mais
French	Maïs	Maïs	Maïs	Maïs
Polish	Kukurydza	Kukurydza	Kukurydza	Kukurydza
Czech	Kukuřice	Kukuřice	Kukuřice	Kukuřice
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.009	11	8	7	6
0.028	34	25	21	17
0.055	66	50	41	33
0.082	99	74	62	49
0.108	130	97	81	65
0.135	162	122	101	81
0.161	193	145	121	97
0.184	220	165	138	110
0.206	247	185	154	124
0.228	274	205	171	137
0.249	299	224	187	150
0.272	326	245	204	163
0.293	352	264	220	176
0.314	377	283	236	188
0.335	402	302	251	201
0.358	429	322	268	215
0.380	456	342	285	228
0.402	483	362	302	241
0.425	510	382	319	255
0.447	536	402	335	268
0.468	562	421	351	281

English	Grass	Grass	Grass	Grass
Italian	Èrba	Èrba	Èrba	Èrba
Dutch	Gras	Gras	Gras	Gras
Spanish	Hierba	Hierba	Hierba	Hierba
Swedish	Gräsfrö	Gräsfrö	Gräsfrö	Gräsfrö
Danish	Græsfrø	Græsfrø	Græsfrø	Græsfrø
German	Grassamen	Grassamen	Grassamen	Grassamen
French	Gazon	Gazon	Gazon	Gazon
Polish	Trawy	Trawy	Trawy	Trawy
Czech	Travní	Travní	Travní	Travní
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.021	25	19	16	13
0.031	37	28	23	18
0.040	48	36	30	24
0.049	59	44	37	30
0.059	71	53	44	35

Small Seeds

Once the "Cal. Factor" value has been obtained from the calibration check procedure, the figure can then be compared with the results below; all the values on this page apply to **small seeds** only.

English	Oilseed Rape	Oilseed Rape	Oilseed Rape	Oilseed Rape
Italian	Còlza	Còlza	Còlza	Còlza
Dutch	Koolzaad	Koolzaad	Koolzaad	Koolzaad
Spanish	Colza	Colza	Colza	Colza
Swedish	Raps	Raps	Raps	Raps
Danish	Raps	Raps	Raps	Raps
German	Raps	Raps	Raps	Raps
French	Colza	Colza	Colza	Colza
Polish	Rzepak	Rzepak	Rzepak	Rzepak
Czech	Řepka	Řepka	Řepka	Řepka
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.003	2	2	1	1
0.005	5	4	3	2
0.008	7	5	5	4
0.011	10	7	6	5
0.013	12	9	8	6
0.016	15	11	9	7
0.019	17	13	11	8
0.021	19	14	12	10
0.024	22	16	14	11
0.027	24	18	15	12

English	Red Clover	Red Clover	Red Clover	Red Clover
Italian	Trifoglio Rosso	Trifoglio Rosso	Trifoglio Rosso	Trifoglio Rosso
Dutch	Rode Klaver	Rode Klaver	Rode Klaver	Rode Klaver
Spanish	Trébol Rojo	Trébol Rojo	Trébol Rojo	Trébol Rojo
Swedish	Rödklöver	Rödklöver	Rödklöver	Rödklöver
Danish	Rødkløver	Rødkløver	Rødkløver	Rødkløver
German	Rotklee	Rotklee	Rotklee	Rotklee
French	Trèfle Rouge	Trèfle Rouge	Trèfle Rouge	Trèfle Rouge
Polish	Koniczyna Czerwona	Koniczyna Czerwona	Koniczyna Czerwona	Koniczyna Czerwona
Czech	Červený Jetel	Červený Jetel	Červený Jetel	Červený Jetel
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.003	2	2	2	1
0.006	6	4	4	3
0.010	9	7	6	5
0.014	13	10	8	6
0.018	16	12	10	8
0.021	19	14	12	10
0.025	23	17	14	11
0.028	25	19	16	13
0.031	28	21	18	14
0.032	29	22	18	15

English	Grass	Grass	Grass	Grass
Italian	Èrba	Èrba	Èrba	Èrba
Dutch	Gras	Gras	Gras	Gras
Spanish	Hierba	Hierba	Hierba	Hierba
Swedish	Gräsfrö	Gräsfrö	Gräsfrö	Gräsfrö
Danish	Græsfrø	Græsfrø	Græsfrø	Græsfrø
German	Grassamen	Grassamen	Grassamen	Grassamen
French	Gazon	Gazon	Gazon	Gazon
Polish	Trawy	Trawy	Trawy	Trawy
Czech	Travní	Travní	Travní	Travní
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.003	3	2	2	1
0.006	6	4	3	3
0.008	8	6	5	4
0.011	10	7	6	5
0.013	12	9	7	6
0.016	14	10	9	7
0.018	16	12	10	8
0.019	17	13	11	9

English	Turnip	Turnip	Turnip	Turnip
Italian	Ràpa	Ràpa	Ràpa	Ràpa
Dutch	Knolraap	Knolraap	Knolraap	Knolraap
Spanish	Nabo	Nabo	Nabo	Nabo
Swedish	Kålrot	Kålrot	Kålrot	Kålrot
Danish	Majroe	Majroe	Majroe	Majroe
German	Rübe	Rübe	Rübe	Rübe
French	Navet	Navet	Navet	Navet
Polish	Rzepa	Rzepa	Rzepa	Rzepa
Czech	Tuřín	Tuřín	Tuřín	Tuřín
Drill Width				
	3	4	4.8	6
Cal Factor (Kg/rev)	Application rate (Kg/Ha)			
0.003	3	2	2	1
0.006	5	4	3	3
0.009	8	6	5	4
0.012	11	8	7	5
0.015	13	10	8	7
0.018	16	12	10	8
0.021	19	14	12	9
0.024	21	16	13	11
0.025	23	17	14	11
0.027	24	18	15	12